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MANUAL REVISION TRANSMITTAL
Manual 143A (61-10-43)
Four Blade Lightweight Turbine Propeller
Overhaul Manual

REVISION 27 dated December 2023

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NOTE 1: When the manual revision has been inserted in the manual, record the information required on the Record of Revisions pages in this manual.

NOTE 2: Pages distributed in this revision may include pages from previous revisions if they are on the opposite side of revised pages. This is done as a convenience to those users who wish to print a two-sided copy of the new revision.

Manual No. 143A
61-10-43
Revision 27
December 2023

Four Blade Lightweight Turbine Propeller Overhaul Manual

HC-D4N-3( )
HC-E4A-3( )
HC-E4N-3( )( )
HC-E4P-3( )
HC-E4W-3( )

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REVISION 27 HIGHLIGHTS

Revision 27, dated December 2023, incorporates the following:

Front matter (Cover, Revision Highlights, etc.), has been revised to match this revision.

Minor language/format changes and renumbering, if applicable are marked with a revision bar, but are not listed below.

- TESTING AND FAULT ISOLATION
  - Revised the section, "Troubleshooting Guide"
  - Revised Figure 1-2, "Checking Blade Play"
- DISASSEMBLY
  - Added Figure 3-1, "Beta Feedback Block Disassembly"
  - Added Figure 3-2, "Pitch Change Knob Bracket Unit Disassembly"
  - Revised the section, "Disassembly of HC-E4A-3( ) Propeller Models"
  - Revised the section, "Disassembly of HC-( )4(N,P)-3( ) and HC-E4W-3( ) Propeller Models"
- CHECK
  - Revised Figure 5-5, "D-488-( ) Cylinder"
  - Revised the section, "Cylinder p/n D-488-( )"
  - Revised the section, "Beta Spring Retainer"
  - Revised the section, "Blade Seal"
  - Revised the section, "Blade Plug
- REPAIR
  - Revised the section, "Specific Repair Requirements"
  - Revised Figure 6-1, "Beta Feedback Block Assembly"
  - Revised the section, "Beta Feedback Block Assembly"
  - Revised Figure 6-4, "Optical Comparator Overlay"
  - Revised the section, "Inspection of the Internal Surface of a Cylinder"
  - Revised Figure 6-5, "Inspection for a Sharp Corner"

REVISION 27 HIGHLIGHTS, CONTINUED

- ASSEMBLY
  - Revised Figure 7-40, "Checking Blade Play"
  - Revised the section, "Assembly of HC-( )4A-3( ) Propeller Models
  - Revised the section, "Assembly of HC-( )4(N,P)-3( ) and HC-E4W-3( ) Propeller Models"
  - Revised Figure 7-48, "Drilling the New Spring Pin Hole for the C-497-( ) Piston Assembly"
  - Revised Figure 7-52, "Position of Counterweight Slugs"
  - Revised the section, "Counterweight Slug Installation
  - Revised Figure 7-53, "Counterweight Slugs Placement"
- FITS AND CLEARANCES
  - Revised Table 8-1, "Torque Values"
  - Revised Figure 8-2, "Blade Play"
  - Revised Table 8-2, "Blade Tolerances"
- ILLUSTRATED PARTS LIST
  - Revised the Counterweights/Mounting Bolts and Counterweight Slugs/Mounting Hardware sections for all propellers
  - Revised Figure 10-13, "HC-D4N-3Q, -3T: Propeller Parts"
  - Revised Figure 10-16, "HC-E4A-3A: Propeller Parts"
  - Revised the illustrated parts list for propeller model HC-E4A-3A
  - Revised Figure 10-19, "HC-E4A-3D: Propeller Parts"
  - Revised the illustrated parts list for propeller model HC-E4A-3D
  - Revised Figure 10-22, "HC-E4A-3I: Propeller Parts"
  - Revised the illustrated parts list for propeller model HC-E4A-3I
  - Revised Figure 10-25, "HC-E4A-3J: Propeller Parts"
  - Revised the illustrated parts list for propeller model HC-E4A-3J
  - Revised Figure 10-28, "HC-E4A-3M: Propeller Parts"
  - Revised the illustrated parts list for propeller model HC-E4A-3M
  - Added the illustrated parts list and figures for propeller model HC-E4N-3KU
  - Revised the illustrated parts list for 107222-( ): Hub Assembly Parts

REVISION 27 HIGHLIGHTS

1. Introduction

   A. General

      (1) This is a list of current revisions that have been issued against this manual. Please compare to RECORD OF REVISIONS page to ensure that all revisions have been added to the manual.

   B. Components

      (1) Revision No. indicates the revisions incorporated in this manual.

      (2) Issue Date is the date of revision.

      (3) Comments indicates the level of the revision.

         (a) New Issue is a new manual distribution. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.

         (b) Reissue is a revision to an existing manual that includes major content and/or major format changes. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.

         (c) Major Revision is a revision to an existing manual that includes major content or minor format changes over a large portion of the manual. The manual is distributed in its entirety. All the page revision dates are the same, but change bars are used to indicate the changes incorporated in the latest revision of the manual.

         (d) Minor Revision is a revision to an existing manual that includes minor content changes to the manual. Only the revised pages of the manual are distributed. Each page retains the date and the change bars associated with the last revision to that page.

Revision No.	Issue Date	Comments
Revision 11	Dec/01	Reissue
Revision 12	July/03	Minor Revision
Revision 13	Jun/08	Minor Revision
Revision 14	Sep/10	Minor Revision
Revision 15	Apr/11	Minor Revision
Revision 16	Nov/13	Minor Revision
Revision 17	Mar/14	Minor Revision
Revision 18	Oct/15	Minor Revision
Revision 19	Nov/16	Minor Revision
Revision 20	Jul/17	Minor Revision
Revision 21	Apr/19	Minor Revision
Revision 22	Dec/19	Minor Revision
Revision 23	Nov/21	Minor Revision
Revision 24	Mar/22	Minor Revision
Revision 25	Oct/22	Minor Revision
Revision 26	Jul/23	Major Revision
Revision 27	Dec/23	Minor Revision

RECORD OF REVISIONS

This is a record of revisions inserted into this manual.
Revision 26 includes all prior revisions.

Revision Number	Issue Date	Date Inserted	Inserted By
26	Jul/23	Jul/23	HPI
27	Dec/23	Dec/23	HPI

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RECORD OF TEMPORARY REVISIONS

Update this page to show all temporary revisions inserted into this manual.
Revision 26 includes all prior temporary revisions, up to and including TR-021.

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RECORD OF TEMPORARY REVISIONS

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SERVICE DOCUMENT LIST

CAUTION 1: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THE SERVICE DOCUMENT. INFORMATION CONTAINED IN A SERVICE DOCUMENT MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. REFER TO THE APPLICABLE SERVICE DOCUMENT INDEX FOR THE MOST RECENT REVISION LEVEL OF THE SERVICE DOCUMENT.

CAUTION 2: THE INFORMATION FOR THE DOCUMENTS LISTED INDICATES THE REVISION LEVEL AND DATE AT THE TIME THAT THE DOCUMENT WAS INITIALLY INCORPORATED INTO THIS MANUAL. INFORMATION CONTAINED IN A SERVICE DOCUMENT MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. REFER TO THE APPLICABLE SERVICE DOCUMENT INDEX FOR THE MOST RECENT REVISION LEVEL OF THE SERVICE DOCUMENT.

Service Document Number	Incorporation Rev./Date
Service Bulletins:	
SB 158B	Rev. 11 Dec/01
SBA 180	Rev. 11 Dec/01
SB 185	Rev. 11 Dec/01
SB 199B	Rev. 11 Dec/01
HC-SB-61-214	Rev. 11 Dec/01
HC-SB-61-215, R3	Rev. 11 Dec/01
HC-SB-61-225, R3	Rev. 11 Dec/01
HC-SB-61-229	Rev. 7 Oct/98
HC-SB-61-231	Rev. 11 Dec/01
HC-SB-61-235	Rev. 7 Oct/98
HC-SB-61-258, R1	Rev. 13 Jun/08
HC-SB-61-276, R4	Rev. 13 Jun/08
HC-SB-61-276, R5	Rev. 14 Sep/10
HC-SB-61-277, R1	Rev. 13 Jun/08
HC-SB-61-278	Rev. 13 Jun/08

Service Document Number	Incorporation Rev./Date
Service Bulletins:	
HC-SB-61-287, R4	Rev. 19 Nov/16
HC-SB-61-289, R1	Rev. 13 Jun/08
HC-SB-61-346, R1	Rev. 17 Mar/14
HC-SB-61-389, R1	Rev. 26 Jul/23

Service Document Number	Incorporation Rev./Date
Service Letters:	
HC-SL-61-181	Rev. 7 Oct/98
HC-SL-61-187, R1	Rev. 8 Nov/99
HC-SL-61-187, R2	Rev. 13 Jun/08
HC-SL-61-195	Rev. 8 Nov/99
HC-SL-61-203	Rev. 11 Dec/01
HC-SL-61-224	Rev. 13 Jun/08
HC-SL-61-240	Rev. 13 Jun/08
HC-SL-61-241, R1	Rev. 13 Jun/08
HC-SL-61-241, R3	Rev. 21 Nov/21
HC-SL-61-250	Rev. 18 Oct/15
HC-SL-61-282	Rev. 13 Jun/08
HC-SL-61-288	Rev. 14 Sep/10
HC-SL-61-301	Rev. 14 Sep/10
HC-SL-61-303	Rev. 14 Sep/10
HC-SL-61-348	Rev. 18 Oct/15
HC-SL-61-350	Rev. 20 Jul/17
HC-SL-61-354	Rev. 19 Nov/16

Service Document Number	Incorporation Rev./Date
Service Instructions:	
SI 152A	Rev. 11 Dec/01
SI 176	Rev. 11 Dec/01
SI 180	Rev. 11 Dec/01
SI 189	Rev. 11 Dec/01
SI 202A	Rev. 11 Dec/01
SI 207A	Rev. 11 Dec/01
SI 212A	Rev. 11 Dec/01

AIRWORTHINESS LIMITATIONS

1. Airworthiness Limitations

   A. Life Limits

      (1) Certain component parts, as well as the entire propeller, may have specific life limits established by the FAA. Such limits require replacement of items after a specific number of hours of use.

      (2) For airworthiness limitations information for lightweight turbine propellers with composite blades, refer to Hartzell Propeller Inc. Owner's Manual 147 (61-00-47).

      (3) For airworthiness limitations information for lightweight turbine propellers with metal blades, refer to Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).

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INTRODUCTION - CONTENTS

LIST OF FIGURES

1. General (Rev. 1)

A. Statement of Purpose

(1) This manual has been reviewed and accepted by the FAA. Additionally, this manual contains data that has been approved in a manner acceptable to the FAA administrator.

(2) This manual provides maintenance and overhaul procedures for use in propeller repair stations by personnel that are trained and experienced with Hartzell Propeller Inc. products.

(a) This manual does not provide complete information for an inexperienced technician to attempt propeller overhaul without supervision.

(3) This manual is intended to be the primary source of maintenance and overhaul information for the applicable Hartzell propeller/component models.

(a) Propeller models addressed in this manual may be Type Certificated by the FAA, or may be experimental. Experimental parts must not be installed on a Type Certificated propeller. Always use the current illustrated parts list for the assembly of any propeller. Always refer to the aircraft Type Certificate (TC) or Supplemental Type Certificate (STC) to determine installation eligibility of any propeller. If installation eligibility is not identifiable, an additional installation approval, such as FAA form 337 field approval or Supplemental Type Certificate may be required. If in doubt, contact Hartzell Propeller Inc. Product Support.

(b) Information published in Service Bulletins, Service Letters, Service Advisories, and Service Instructions may supersede information published in this manual. The reader must consult active Service Bulletins, Service Letters, Service Advisories, and Service Instructions for information that may have not yet been incorporated into the latest revision of this manual.

(4) This manual makes reference to other Hartzell Propeller Inc. manuals that provide important details for procedures such as anodizing, penetrant inspection, and overhaul procedures for hub units.

(5) Where possible, this manual is written in the format specified by ATA iSpec 2200.

B. Item References

(1) Item references throughout the text in this manual refer to item numbers in the Illustrated Parts List chapter of this manual. The item numbers appear in parentheses directly following the part name. Only the item base number will appear in the text of the manual. Item base numbers and the alpha variants of the base numbers will appear in the illustrated parts list. There are two reasons for the use of alpha variants:

(a) A part may be superseded, replaced, or obsoleted by another part. For example, the pitch change block unit (105733) that is item 320 was superseded by the pitch change block unit (105733-1) that is item 320A.

(b) An Illustrated Parts List may contain multiple configurations. Effectivity codes are used to distinguish different part numbers within the same list. For example, one configuration may use a piston (B-2419) that is item 80, yet another configuration uses a piston (104256) that is item 80A. Effectivity codes are very important in the determination of parts in a given configuration.

2. Reference Publications

A. Hartzell Propeller Inc. Publications

(1) Information published in Service Bulletins, Service Letters, Service Advisories, and Service Instructions may supersede information published in this manual. The reader must consult active Service Bulletins, Service Letters, Service Advisories, and Service Instructions for information that may have not yet been incorporated into the latest revision of this manual.

(2) In addition to this manual, one or more of the following publications are required for information regarding specific recommendations and procedures to maintain propeller assemblies that are included in this manual.

Manual No. (ATA No.)	Available at www.hartzellprop.com	Hartzell Propeller Inc. Manual Title
n/a	Yes	Active Hartzell Propeller Inc. Service Bulletins, Service Letters, Service Instructions, and Service Advisories
Manual 127 (61-16-27)	Yes	Metal Spinner Maintenance Manual
Manual 133C (61-13-33)	-	Aluminum Blade Overhaul Manual
Manual 135F (61-13-35)	-	Composite Blade Overhaul Manual
Manual 147 (61-00-47)	Yes	Propeller Owner's Manual and Logbook for Lightweight Turbine Propeller Models with Composite Blades
Manual 149 (61-00-49)	Yes	Propeller Owner's Manual and Logbook for Lightweight Turbine Propeller Models with Aluminum Blades
Manual 159 (61-02-59)	Yes	Application Guide
Manual 165A (61-00-65)	Yes	Illustrated Tool and Equipment Manual
Manual 180 (30-61-80)	Yes	Ice Protection System Manual
Manual 202A (61-01-02)	Vol. 7, Yes Vol. 11, Yes	Standard Practices Manual, Volumes 1 through 11

B. Vendor Publications

None.

3. Personnel Requirements (Rev. 1)

A. Service and Maintenance Procedures in this Manual

(1) Personnel performing the service and maintenance procedures in this manual are expected to have the required equipment/tooling, training, and certifications (when required by the applicable Aviation Authority) to accomplish the work in a safe and airworthy manner.

(2) Compliance to the applicable regulatory requirements established by the Federal Aviation Administration (FAA) or international equivalent is mandatory for anyone performing or accepting responsibility for the inspection and/or repair of any Hartzell Propeller Inc. product.

(a) Maintenance records must be kept in accordance with the requirements established by the Federal Aviation Administration (FAA) or international equivalent.

(b) Refer to Federal Aviation Regulation (FAR) Part 43 for additional information about general aviation maintenance requirements.

4 Special Tooling and Consumable Materials (Rev. 1)

A. Special Tooling

(1) Special tooling may be required for procedures in this manual. For further tooling information, refer to Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165A (61-00-65).

(a) Tooling reference numbers appear with the prefix “TE” directly following the tool name to which they apply. For example, a template that is reference number 133 will appear as: template TE133.

B. Consumable Materials

(1) Consumable materials are referenced in certain sections throughout this manual. Specific approved materials are listed in the Consumable Materials chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(a) Consumable material reference numbers appear with the prefix “CM” directly following the material to which they apply. For example, an adhesive that is reference number 16 will appear as: adhesive CM16. Only the material(s) specified can be used.

5. Safe Handling of Paints and Chemicals (Rev.1)

   A. Instructions for Use

      (1) Always use caution when handling or being exposed to paints and/or chemicals during propeller overhaul and/or maintenance procedures.

      (2) Before using paint or chemicals, always read the manufacturer's label on the container(s) and follow specified instructions and procedures for storage, preparation, mixing, and/or application.

      (3) Refer to the product's Material Safety Data Sheet (MSDS) for detailed information about the physical properties, health, and physical hazards of any paint or chemical.

6. Calendar Limits and Long Term Storage (Rev. 2)

   A. Calendar Limits

      (1) The effects of exposure to the environment over a period of time create a need for propeller overhaul regardless of flight time.

      (2) A calendar limit between overhauls is specified in Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.

      (3) Experience has shown that special care, such as keeping an aircraft in a hangar, is not sufficient to permit extension of the calendar limit.

      (4) The start date for the calendar limit is when the propeller is first installed on an engine.

      (5) The calendar limit is not interrupted by subsequent removal and/or storage.

      (6) The start date for the calendar limit must not be confused with the warranty start date, that is with certain exceptions, the date of installation by the first retail customer.

   B. Long Term Storage

      (1) Propellers that have been in storage have additional inspection requirements before installation. Refer to the Packaging and Storage chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

7. Component Life and Overhaul (Rev. 2)

WARNING: CERTAIN PROPELLER COMPONENTS USED IN NON-AVIATION APPLICATIONS ARE MARKED WITH DIFFERENT PART NUMBERS TO DISTINGUISH THEM FROM COMPONENTS USED IN AVIATION APPLICATIONS. DO NOT ALTER THE PART NUMBERS SHOWN ON PARTS DESIGNATED FOR NON-AVIATION APPLICATIONS OR OTHERWISE APPLY THOSE PARTS FOR USE ON AVIATION APPLICATIONS.

A. Component Life

(1) Component life is expressed in terms of hours of service (Time Since New, TSN) and in terms of hours of service since overhaul (Time Since Overhaul, TSO).

NOTE: TSN/TSO is considered as the time accumulated between rotation and landing, i.e., flight time.

(2) Time Since New (TSN) and Time Since Overhaul (TSO) records for the propeller hub and blades must be maintained in the propeller logbook.

(3) Both TSN and TSO are necessary for defining the life of the component. Certain components, or in some cases an entire propeller, may be "life limited", which means that they must be replaced after a specified period of use (TSN).

(a) It is a regulatory requirement that a record of the Time Since New (TSN) be maintained for all life limited parts.

(b) Refer to the Airworthiness Limitations chapter in the applicable Hartzell Propeller Inc. Owner's Manual for a list of life limited components.

(4) When a component or assembly undergoes an overhaul, the TSO is returned to zero hours.

(a) Time Since New (TSN) can never be returned to zero.

(b) Repair without overhaul does not affect TSO or TSN.

(5) Blades and hubs are sometimes replaced while in service or at overhaul.

(a) Maintaining separate TSN and TSO histories for a replacement hub or blade is required.

(b) Hub replacement

1 If the hub is replaced, the replacement hub serial number must be recorded (the entry signed and dated) in the propeller logbook.

2 The propeller will be identified with the serial number of the replacement hub.

NOTE: Propeller assembly serial numbers are impression stamped on the hub. For stamping information, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

3 The TSN and TSO of the replacement hub must be recorded and maintained in the propeller logbook.

4 If tracking any component(s) other than the hub/blades, maintain these TSN/TSO records separately in the propeller logbook.

NOTE: Hub replacement does not affect the TSN/TSO of any other propeller components.

B. Overhaul

(1) Overhaul is the periodic disassembly, cleaning, inspecting, repairing as necessary, reassembling, and testing in accordance with approved standards and technical data approved by Hartzell Propeller Inc.

(2) The overhaul interval is based on hours of service, i.e., flight time, or on calendar time.

(a) Overhaul intervals are specified in Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.

(b) At such specified periods, the propeller hub assembly and the blade assemblies must be completely disassembled and inspected for cracks, wear, corrosion, and other unusual or abnormal conditions.

(3) Overhaul must be completed in accordance with the latest revision of the applicable component maintenance manual and other publications applicable to, or referenced in, the component maintenance manual.

(a) Parts that are not replaced at overhaul must be inspected in accordance with the check criteria in the applicable Hartzell Propeller Inc. component maintenance manual.

(b) Parts that must be replaced at overhaul are identified by a "Y" in the O/H column of the Illustrated Parts List in the applicable Hartzell Propeller Inc. component maintenance manual.

(4) The information in this manual supersedes data in all previously published revisions of this manual.

8. Damage/Repair Types (Rev. 1)

A. Airworthy/Unairworthy Damage

(1) Airworthy damage is a specific condition to a propeller component that is within the airworthy damage limits specified in the applicable Hartzell Propeller Inc. component maintenance manual.

(a) Airworthy damage does not affect the safety or flight characteristics of the propeller and conforms to its type design.

(b) Airworthy damage does not require repair before further flight, but should be repaired as soon as possible to prevent degradation of the damage.

(2) Unairworthy damage is a specific condition to a propeller component that exceeds the airworthy damage limits specified in the applicable Hartzell Propeller Inc. component maintenance manual.

(a) Unairworthy damage can affect the safety or flight characteristics of the propeller and does not conform to its type design.

(b) Unairworthy damage must be repaired before the propeller is returned to service.

B. Minor/Major Repair

(1) Minor Repair

(a) Minor repair is that which may be done safely in the field by a certified aircraft mechanic.

1 For serviceable limits and repair criteria for Hartzell propeller components, refer to the applicable Hartzell Propeller Inc. component maintenance manual.

(2) Major Repair

(a) Major repair cannot be done by elementary operations.

(b) Major repair work must be accepted by an individual that is certified by the Federal Aviation Administration (FAA) or international equivalent.

1 Hartzell recommends that individuals performing major repairs also have a Factory Training Certificate from Hartzell Propeller Inc.

2 The repair station must meet facility, tooling, and personnel requirements and is required to participate in Hartzell Propeller Inc. Sample Programs as defined in the Approved Facilities chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

9. Propeller Critical Parts (Rev. 1)

A. Propeller Critical Parts

(1) Procedures in this manual may involve Propeller Critical Parts (PCP).

(a) These procedures have been substantiated based on Engineering analysis that expects this product will be operated and maintained using the procedures and inspections provided in the Instructions for Continued Airworthiness (ICA) for this product.

(b) Refer to the Illustrated Parts List chapter in the applicable Hartzell Propeller Inc. maintenance manual to identify the Propeller Critical Parts.

(2) Numerous propeller system parts can produce a propeller Major or Hazardous effect, even though those parts may not be considered as Propeller Critical Parts.

(a) The operating and maintenance procedures and inspections provided in the ICA for this product are, therefore, expected to be accomplished for all propeller system parts.

10. Warranty Service (Rev. 1)

A. Warranty Claims

(1) If you believe you have a warranty claim, contact the Hartzell Propeller Inc. Product Support Department to request a *Warranty Application* form. Complete this form and return it to Hartzell Product Support for evaluation **before proceeding with repair or inspection work**. Upon receipt of this form, the Hartzell Product Support Department will provide instructions on how to proceed.

(a) For Hartzell Propeller Inc. Product Support Department contact information, refer to the “Contact Information” section in this chapter.

11. Hartzell Propeller Inc. Contact Information (Rev. 2)

A. Product Support Department

(1) Contact the Product Support Department of Hartzell Propeller Inc. about any maintenance problems or to request information not included in this publication.

NOTE: When calling from outside the United States, dial (001) before dialing the telephone numbers below.

(a) Hartzell Propeller Inc. Product Support may be reached during business hours (8:00 a.m. through 5:00 p.m., United States Eastern Time) at (937) 778-4379 or at (800) 942-7767, toll free from the United States and Canada.

(b) Hartzell Propeller Inc. Product Support can also be reached by fax at (937) 778-4215, and by e-mail at techsupport@hartzellprop.com.

(c) After business hours, you may leave a message on our 24 hour product support line at (937) 778-4376 or at (800) 942-7767, toll free from the United States and Canada.

1 A technical representative will contact you during normal business hours.

2 Urgent AOG support is also available 24 hours per day, seven days per week via this message service.

(d) Additional information is available on the Hartzell Propeller Inc. website at www.hartzellprop.com.

B. Technical Publications Department

(1) For Hartzell Propeller Inc. service literature and revisions, contact:

Hartzell Propeller Inc.
Attn: Technical Publications Department
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.

Telephone: 937.778.4200
Fax: 937.778.4215
E-mail: manuals@hartzellprop.com

C. Recommended Facilities

(1) Hartzell Propeller Inc. recommends using Hartzell-approved distributors and repair facilities for the purchase, repair, and overhaul of Hartzell propeller assemblies or components.

(2) Information about the Hartzell Propeller Inc. worldwide network of aftermarket distributors and approved repair facilities is available on the Hartzell website at www.hartzellprop.com.

12. "Video" Icon/QR Code

A. Instructions for Use

(1) The "Video" icon/QR code (refer to Figure 1) that appears in this manual allows you to access a video or animated demonstration of the applicable procedure.

CAUTION: THESE VIDEOS/ANIMATIONS ARE INTENDED TO SUPPLEMENT THE APPLICABLE INSTRUCTIONS. THEY SHOULD NOT BE USED WITHOUT FIRST READING AND UNDERSTANDING THE LATEST REVISION OF THE PROCEDURE AND ANY APPLICABLE WARNINGS/CAUTIONS.

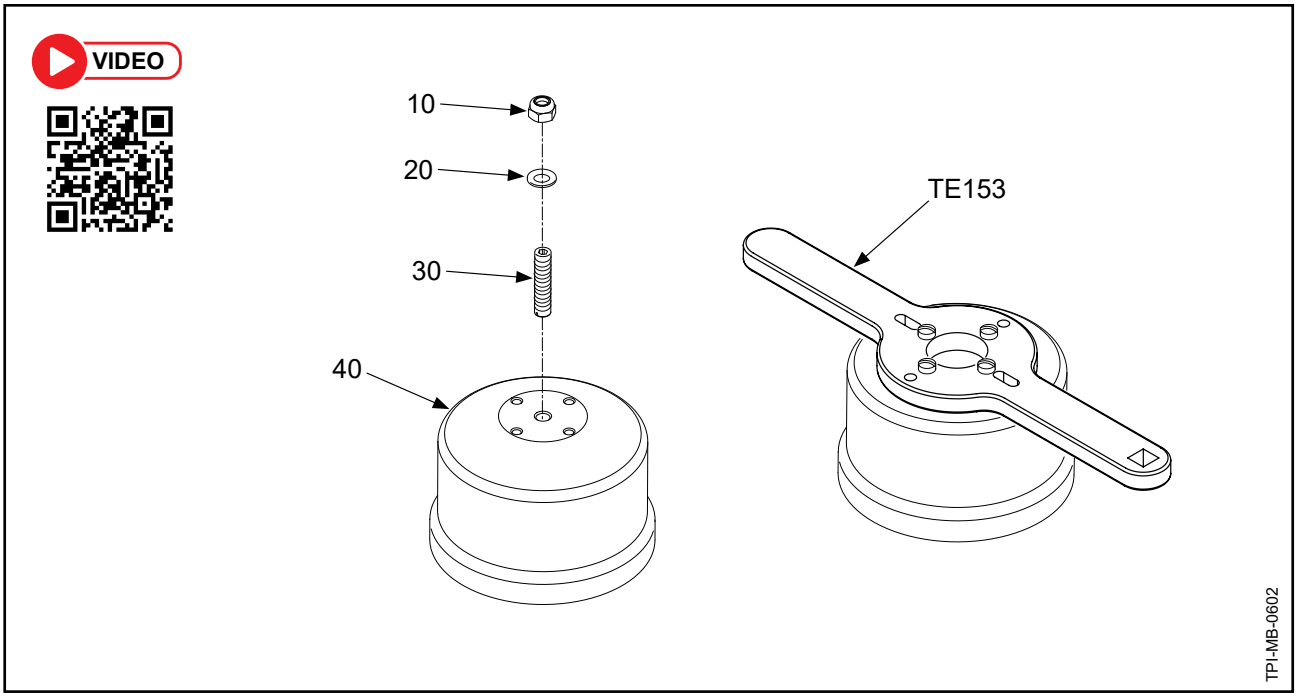
(2) To access the video/animated demonstration:

(a) If viewing the document file digitally:

1 Click on the QR code

(b) From a printed copy of the page:

1 Scan the QR code from any mobile device equipped with a QR reader application.



"Video" Icon/QR Code
Figure 1

13. Definitions (Rev. 4)

A basic understanding of the following terms will assist in maintaining and operating Hartzell Propeller Inc. propeller systems.

Term	Definition
Annealed	Softening of material due to overexposure to heat
Aviation Certified	Intended for FAA or international equivalent type certificated aircraft applications. A TC and PC number must be stamped on the hub, and a PC number must be stamped on blades.
Aviation Experimental	Intended for aircraft/propeller applications not certified by the FAA or international equivalent. Products marked with an “X” at or near the end of the model number or part number are not certified by the FAA or international equivalent and are not intended to use on certificated aircraft.
Beta Operation	A mode of pitch control that is directed by the pilot rather than by the propeller governor
Beta Range	Blade angles between low pitch and maximum reverse blade angle
Beta System	Parts and/or equipment related to operation (manual control) of propeller blade angle between low pitch blade angle and full reverse blade angle
Blade Angle	Measurement of blade airfoil location described as the angle between the blade airfoil and the surface described by propeller rotation
Blade Centerline	An imaginary reference line through the length of a blade around which the blade rotates
Blade Station	Refers to a location on an individual blade for blade inspection purposes. It is a measurement from the blade “zero” station to a location on a blade, used to apply blade specification data in blade overhaul manuals. Note: Do not confuse *blade station* with *reference blade radius*; they may not originate at the same location.
Blemish	An imperfection with visible attributes, but having no impact on safety or utility
Brinelling	A depression caused by failure of the material in compression

Term	Definition
Bulge	An outward curve or bend
Camber	The surface of the blade that is directed toward the front of the aircraft. It is the low pressure, or suction, side of the blade. The camber side is convex in shape over the entire length of the blade.
Chord	A straight line distance between the leading and trailing edges of an airfoil
Chordwise	A direction that is generally from the leading edge to the trailing edge of an airfoil
Co-bonded	The act of bonding a composite laminate and simultaneously curing it to some other prepared surface
Composite Material	Kevlar®, carbon, or fiberglass fibers bound together with, or encapsulated within an epoxy resin
Compression Rolling	A process that provides improved strength and resistance to fatigue
Constant Force	A force that is always present in some degree when the propeller is operating
Constant Speed	A propeller system that employs a governing device to maintain a selected engine RPM
Corrosion (Aluminum)	The chemical or electrochemical attack by an acid or alkaline that reacts with the protective oxide layer and results in damage of the base aluminum. Part failure can occur from corrosion due to loss of structural aluminum converted to corrosion product, pitting, a rough etched surface finish, and other strength reduction damage caused by corrosion.
Corrosion (Steel)	Typically, an electrochemical process that requires the simultaneous presence of iron (component of steel), moisture and oxygen. The iron is the reducing agent (gives up electrons) while the oxygen is the oxidizing agent (gains electrons). Iron or an iron alloy such as steel is oxidized in the presence of moisture and oxygen to produce rust. Corrosion is accelerated in the presence of salty water or acid rain. Part failure can occur from corrosion due to loss of structural steel converted to corrosion product, pitting, a rough etched surface finish and other strength reduction damage caused by corrosion.

Term	Definition
Corrosion Product (Aluminum)	A white or dull gray powdery material that has an increased volume appearance (compared to non-corroded aluminum). Corrosion product is not to be confused with damage left in the base aluminum such as pits, worm holes, and etched surface finish.
Corrosion Product (Steel)	When iron or an iron alloy such as steel corrodes, a corrosion product known as rust is formed. Rust is an iron oxide which is reddish in appearance and occupies approximately six times the volume of the original material. Rust is flakey and crumbly and has no structural integrity. Rust is permeable to air and water, therefore the interior metallic iron (steel) beneath a rust layer continues to corrode. Corrosion product is not to be confused with damage left in the base steel such as pits and etched surface finish.
Crack	Irregularly shaped separation within a material, sometimes visible as a narrow opening at the surface
Debond	Separation of two materials that were originally bonded together in a separate operation
Defect	An imperfection that affects safety or utility
Delamination	Internal separation of the layers of composite material
Dent	The permanent deflection of the cross section that is visible on both sides with no visible change in cross sectional thickness
Depression	Surface area where the material has been compressed but not removed
Distortion	Alteration of the original shape or size of a component
Edge Alignment	Distance from the blade centerline to the leading edge of the blade
Erosion	Gradual wearing away or deterioration due to action of the elements
Exposure	Leaving material open to action of the elements

Term	Definition
Face	The surface of the blade that is directed toward the rear of the aircraft. The face side is the high pressure, or thrusting, side of the blade. The blade airfoil sections are normally cambered or curved such that the face side of the blade may be flat or even concave in the midblade and tip region.
Face Alignment	Distance from the blade centerline to the highest point on the face side perpendicular to the chord line
Feathering	The capability of blades to be rotated parallel to the relative wind, thus reducing aerodynamic drag
Fraying	A raveling or shredding of material
Fretting	Damage that develops when relative motion of small displacement takes place between contacting parts, wearing away the surface
Galling	To fret or wear away by friction
Gouge	Surface area where material has been removed
Hazardous Propeller Effect	The hazardous propeller effects are defined in Title 14 CFR section 35.15(g)(1)
Horizontal Balance	Balance between the blade tip and the center of the hub
Impact Damage	Damage that occurs when the propeller blade or hub assembly strikes, or is struck by, an object while in flight or on the ground
Inboard	Toward the butt of the blade
Intergranular Corrosion	Corrosion that attacks along the grain boundaries of metal alloys
Jog	A term used to describe movement up/down, left/right, or on/off in short incremental motions
Laminate	To unite composite material by using a bonding material, usually with pressure and heat
Lengthwise	A direction that is generally parallel to the pitch axis
Loose Material	Material that is no longer fixed or fully attached
Low Pitch	The lowest blade angle attainable by the governor for constant speed operation

Term	Definition
Major Propeller Effect	The major propeller effects are defined in Title 14 CFR section 35.15(g)(2)
Minor Deformation	Deformed material not associated with a crack or missing material
Monocoque	A type of construction in which the outer skin carries all or a major part of the load
Nick	Removal of paint and possibly a small amount of material
Non-Aviation Certified	Intended for non-aircraft application, such as Hovercraft or Wing in Ground Effect (WIG) applications. These products are certificated by an authority other than FAA. The hub and blades will be stamped with an identification that is different from, but comparable to TC and PC.
Non-Aviation Experimental	Intended for non-aircraft application, such as Hovercraft or Wing-In-Ground effect (WIG) applications. Products marked with an “X” at or near the end of the model number or part number are not certified by any authority and are not intended for use on certificated craft.
Onspeed	Condition in which the RPM selected by the pilot through the propeller control/condition lever and the actual engine (propeller) RPM are equal
Open Circuit	Connection of high or infinite resistance between points in a circuit which are normally lower
Outboard	Toward the tip of the blade
Overhaul	The periodic disassembly, inspection, repair, refinish, and reassembly of a propeller assembly to maintain airworthiness
Overspeed	Condition in which the RPM of the propeller or engine exceeds predetermined maximum limits; the condition in which the engine (propeller) RPM is higher than the RPM selected by the pilot through the propeller control/condition lever
Pitch	Same as “Blade Angle”
Pitting	Formation of a number of small, irregularly shaped cavities in surface material caused by corrosion or wear

Term	Definition
Pitting (Linear)	The configuration of the majority of pits forming a pattern in the shape of a line
Porosity	An aggregation of microvoids. See “voids”.
Propeller Critical Parts	A part on the propeller whose primary failure can result in a hazardous propeller effect, as determined by the safety analysis required by Title 14 CFR section 35.15
Reference Blade Radius	Refers to the propeller reference blade radius in an assembled propeller, e.g., 30-inch radius. A measurement from the propeller hub centerline to a point on a blade, used for blade angle measurement in an assembled propeller. An adhesive stripe (blade angle reference tape CM160) is usually located at the reference blade radius location. Note: Do not confuse *reference blade radius* with *blade station*; they may not originate at the same point.
Reversing	The capability of rotating blades to a position to generate reverse thrust to slow the aircraft or back up
Scratch	Same as “Nick”
Short Circuit	Connection of low resistance between points on a circuit between which the resistance is normally much greater
Shot Peening	Process where steel shot is impinged on a surface to create compressive surface stress, that provides improved strength and resistance to fatigue
Single Acting	Hydraulically actuated propeller that utilizes a single oil supply for pitch control
Split	Delamination of blade extending to the blade surface, normally found near the trailing edge or tip
Station Line	See "Blade Station"
Synchronizing	Adjusting the RPM of all the propellers of a multi-engine aircraft to the same RPM
Synchrophasing	A form of propeller sychronization in which not only the RPM of the engines (propellers) are held constant, but also the position of the propellers in relation to each other
Ticking	A series of parallel marks or scratches running circumferentially around the diameter of the blade

Term	Definition
Track	In an assembled propeller, a measurement of the location of the blade tip with respect to the plane of rotation, used to verify face alignment and to compare blade tip location with respect to the locations of the other blades in the assembly
Trailing Edge	The aft edge of an airfoil over which the air passes last
Trimline	Factory terminology referring to where the part was trimmed to length
Underspeed	The condition in which the actual engine (propeller) RPM is lower than the RPM selected by the pilot through the propeller control/condition lever
Unidirectional Material	A composite material in which the fibers are substantially oriented in the same direction
Variable Force	A force that may be applied or removed during propeller operation
Vertical Balance	Balance between the leading and trailing edges of a two-blade propeller with the blades positioned vertically
Voids	Air or gas that has been trapped and cured into a laminate
Windmilling	The rotation of an aircraft propeller caused by air flowing through it while the engine is not producing power
Woven Fabric	A material constructed by interlacing fiber to form a fabric pattern
Wrinkle (aluminum blade)	A wavy appearance caused by high and low material displacement
Wrinkle (composite blade)	Overlap or fold within the material

14. Abbreviations (Rev. 2)

Abbreviation	Term
AD	Airworthiness Directives
AMM	Aircraft Maintenance Manual
AOG	Aircraft on Ground
AR	As Required
ATA	Air Transport Association
CSU	Constant Speed Unit
FAA	Federal Aviation Administration
FH	Flight Hour
FM	Flight Manual
FMS	Flight Manual Supplement
Ft-Lb	Foot-Pound
HMI	Human Machine Interface
ICA	Instructions for Continued Airworthiness
ID	Inside Diameter
In-Lb	Inch-Pound
IPL	Illustrated Parts List
IPS	Inches Per Second
kPa	Kilopascals
Lb(s)	Pound(s)
Max.	Maximum
Min.	Minimum
MIL-X-XXX	Military Specification
MPI	Major Periodic Inspection (Overhaul)
MS	Military Standard
MSDS	Material Safety Data Sheet
N	Newtons

Abbreviation	Term
N/A	Not Applicable
NAS	National Aerospace Standards
NASM	National Aerospace Standards, Military
NDT	Nondestructive Testing
NIST	National Institute of Standards and Technology
N•m	Newton-Meters
OD	Outside Diameter
OPT	Optional
PC	Production Certificate
PCP	Propeller Critical Part
PLC	Programmable Logic Controller
PMB	Plastic Media Blasting (Cleaning)
POH	Pilot’s Operating Handbook
PSI	Pounds per Square Inch
RF	Reference
RPM	Revolutions per Minute
SAE	Society of Automotive Engineers
STC	Supplemental Type Certificate
TBO	Time Between Overhaul
TC	Type Certificate
TSI	Time Since Inspection
TSN	Time Since New
TSO	Time Since Overhaul
UID	Unique Identification
WIG	Wing-In-Ground-Effect

DESCRIPTION AND OPERATION - CONTENTS

LIST OF FIGURES

LIST OF TABLES

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1. General (Rev. 2)

   A. Propeller/Blade Model Designation

      (1) Hartzell Propeller Inc. uses a model number designation system to identify specific propeller and blade assemblies. The propeller model number and blade model number are separated by a slash (/).

         (a) Example: *propeller model number / blade model number*

      (2) The propeller model number is impression stamped on the propeller hub.

         (a) For additional information about the propeller model number designation system, refer to the applicable Hartzell Propeller Inc. owner's manual.

      (3) The blade model number is impression stamped on the butt end of the blade, and also identified by a label on the cylinder.

         (a) For additional information about the model number designation system for composite blades, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

         (b) For additional information about the model number designation system for aluminum blades, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

2. Description

   CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THIS MANUAL FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

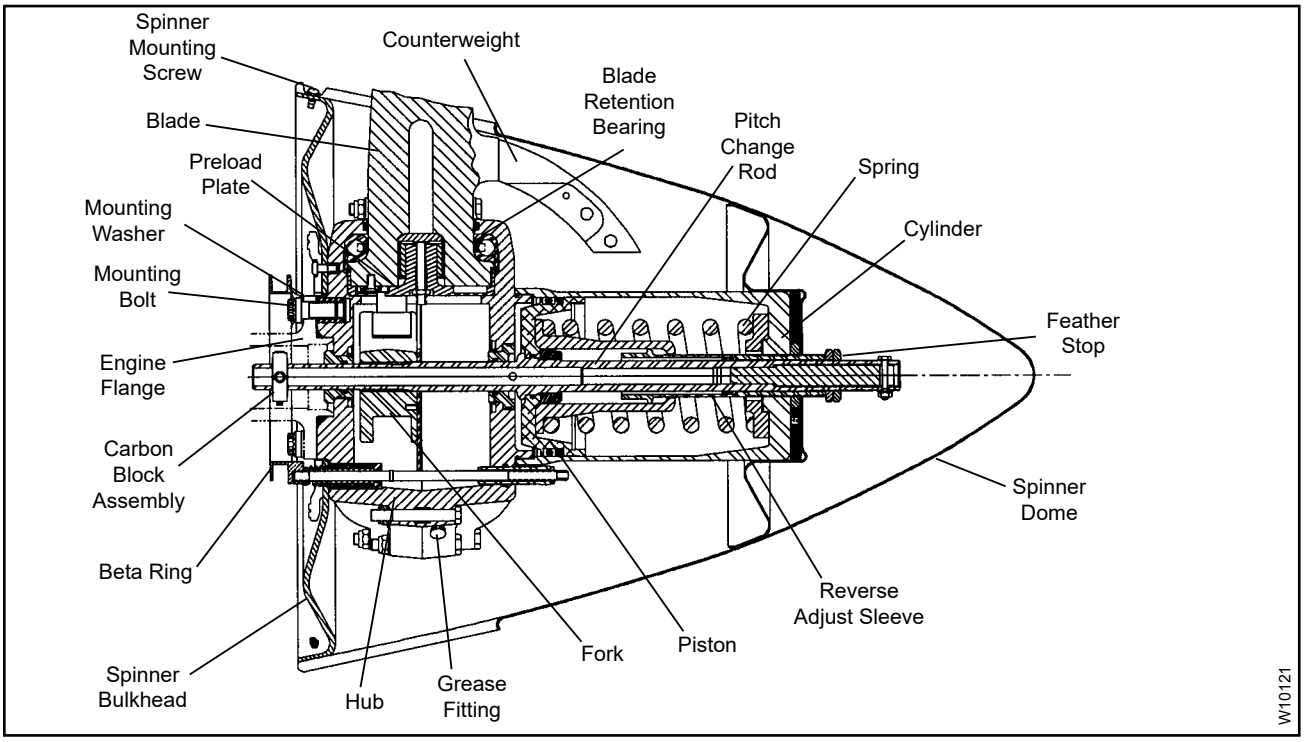
   A. General

      (1) A Hartzell lightweight turbine propeller uses either aluminum or composite blades mounted in an aluminum hub. The hub is held together with bolts and contains the pitch change mechanism. The pitch change components include the piston, pitch change rod, fork, and pitch change knobs.

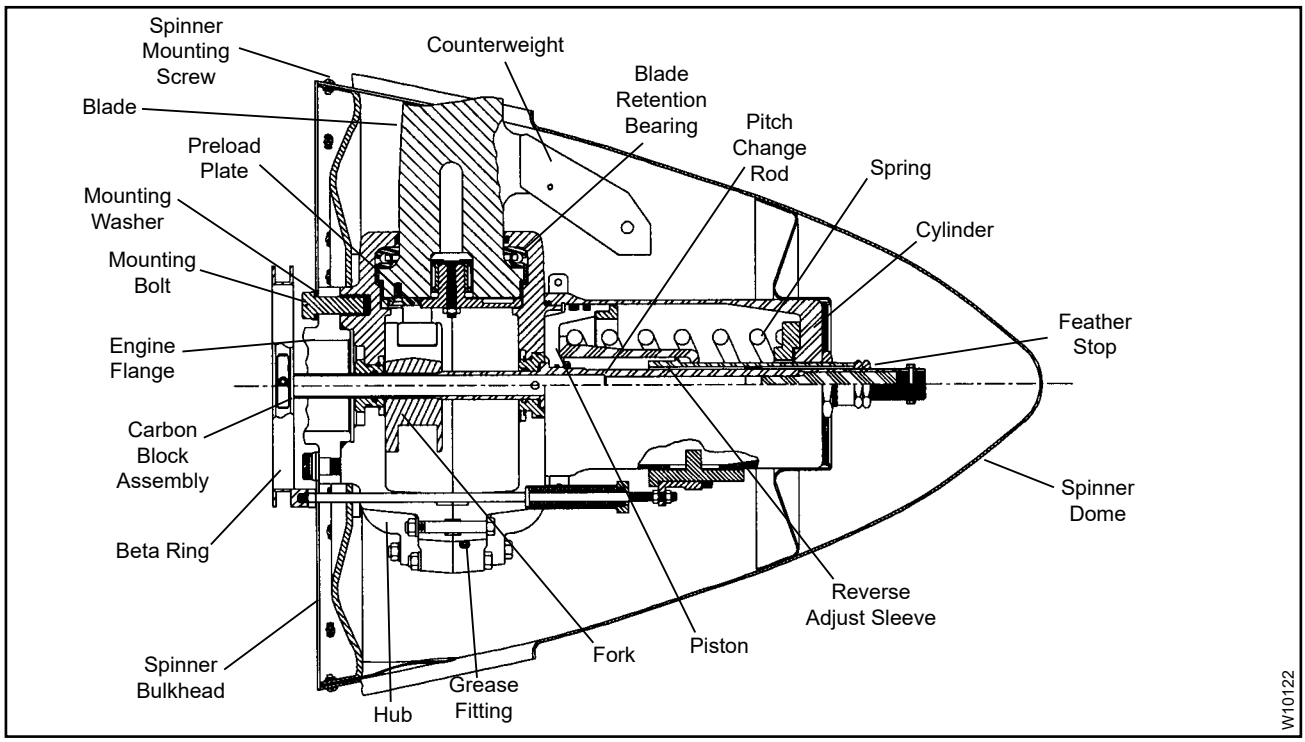
   B. Components

      NOTE: Specific Hartzell Propeller Inc. manuals and service documents are available on the Hartzell website at www.hartzellprop.com. Refer to the Required Publications section in the Introduction chapter of this manual for the identification of these publications.

      (1) Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) or the applicable owner's manual for additional information about the model number designation system.



HC-(D,E)4(N,P,W)-3( ) Series Propeller
Figure 1



HC-(D,E)4A-3( ) Series Propeller
Figure 2

3. Operation

A. Lightweight Turbine Propellers

Refer to Figures 1 and 2. The propellers described in this section are constant speed, feathering and reversing. They use a single oil supply from a governing device to hydraulically actuate a change in blade angle. The propellers are four-bladed and are used primarily on Pratt & Whitney turbine engines.

A two piece aluminum hub retains each propeller blade on a thrust bearing. A cylinder is attached to the hub and contains a feathering spring and piston. The hydraulically actuated piston transmits linear motion through a pitch change rod and fork to each blade to result in blade angle change.

While the propeller is operating the following forces are constantly present, 1) spring force, 2) counterweight force, 3) centrifugal twisting moment of each blade and 4) blade aerodynamic twisting forces. The spring and counterweight forces attempt to rotate the blades to higher blade angle while the centrifugal twisting moment of each blade is generally toward lower blade angle. Blade aerodynamic twisting force is very small in relation to the other forces and can attempt to increase or decrease blade angle.

Summation of the propeller forces is toward higher pitch (low RPM) and is opposed by a variable force toward lower pitch (high RPM). The variable force is oil under pressure from a governor with an internal pump that is mounted on and driven by the engine. The oil from the governor is supplied to the propeller and hydraulic piston through a hollow engine shaft. Increasing the volume of oil within the piston and cylinder will decrease the blade angle and increase propeller RPM. Decreasing the volume of oil will increase blade angle and decrease propeller RPM. By changing the blade angle, the governor can vary the load on the engine and maintain constant engine RPM (within limits), independent of where the power lever is set. The governor uses engine speed sensing mechanisms that allow it to supply or drain oil as necessary to maintain constant engine speed (RPM).

If governor supplied oil is lost during operation, the propeller will increase pitch and feather. Feathering occurs because the summation of internal propeller forces causes the oil to drain out of the propeller until the feather stop position is reached.

Normal in-flight feathering is accomplished when the pilot retards the propeller condition lever past the feather detent. This allows control oil to drain from the propeller and return to the engine sump. Engine shutdown is normally accomplished during the feathering process.

Normal in-flight unfeathering is accomplished when the pilot positions the propeller condition lever into the normal flight (governing) range and restarts the engine. As engine speed increases, the governor supplies oil to the propeller and the blade angle decreases.

In reverse mode of operation, the governor operates in an underspeed condition to act strictly as a source of pressurized oil, without attempting to control RPM. Control of the propeller blade angle in reverse is accomplished with the beta valve.

NOTE: The beta valve is normally built into the base of the governor.

The propeller is reversed by manually repositioning the cockpit-control to cause the beta valve to supply oil from the governor pump to the propeller. Several external propeller mechanisms, which include a beta ring and carbon block assembly, communicate propeller blade angle position to the beta valve.

When the propeller reaches the desired reverse position, movement of the beta ring and carbon block assembly initiated by the propeller piston, causes the beta valve to shut off the flow of oil to the propeller. Any additional unwanted movement of the propeller toward reverse, or any movement of the manually positioned beta valve control toward high pitch position will cause the beta valve to drain oil from the propeller to increase pitch.

TESTING AND FAULT ISOLATION - CONTENTS

LIST OF FIGURES

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1. Troubleshooting Guide

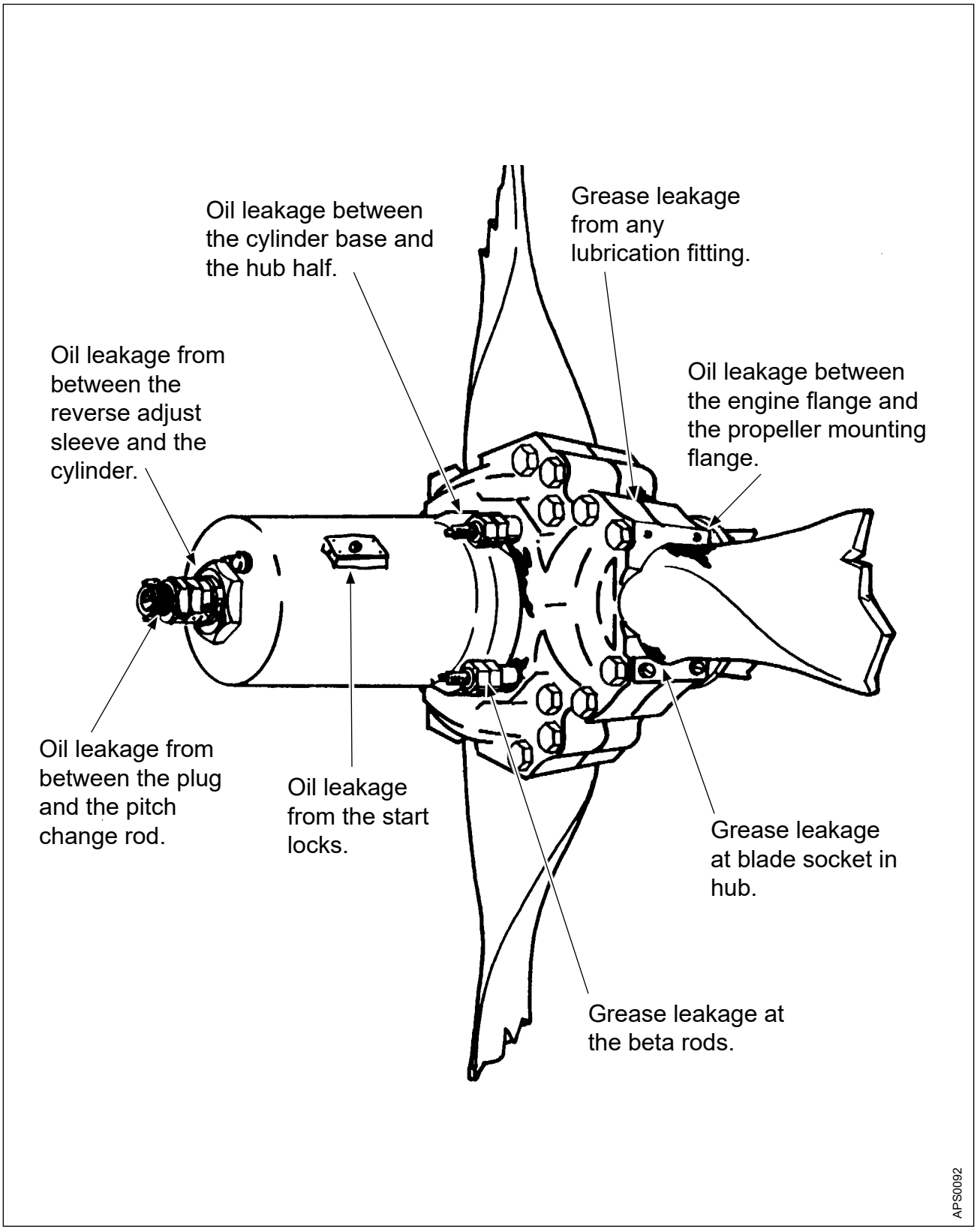
CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

The purpose of this chapter is to isolate probable causes and suggest remedies for common propeller service problems. In all cases, the remedy for a problem should follow the procedures detailed in the applicable section of this manual.

Problem		Probable Cause	Remedy
A. Pitch Control Difficulty.		Excessive friction in moving parts.	Refer to problem 1.B. Friction.
	or	Oil passages are not clear and open.	Check out the hydraulic system.
	or	Incorrect governor has been installed.	Refer to the airframe or the engine manufacturer's maintenance manual for installation instructions.
B. Friction.		Blade Preload is excessive.	Disassemble the propeller and readjust the blade preload.
	or	Lack of lubrication.	Add approved lubricant.
	or	Balls in the blade retention split-bearing are unusually rough, corroded, or chipped.	Replace the blade retention split-bearing assembly.
	or	Insufficient clearance between the various moving parts in the pitch change mechanism.	Check the moving parts individually. Increase the clearances between the individual parts as necessary to decrease friction in the mechanism.

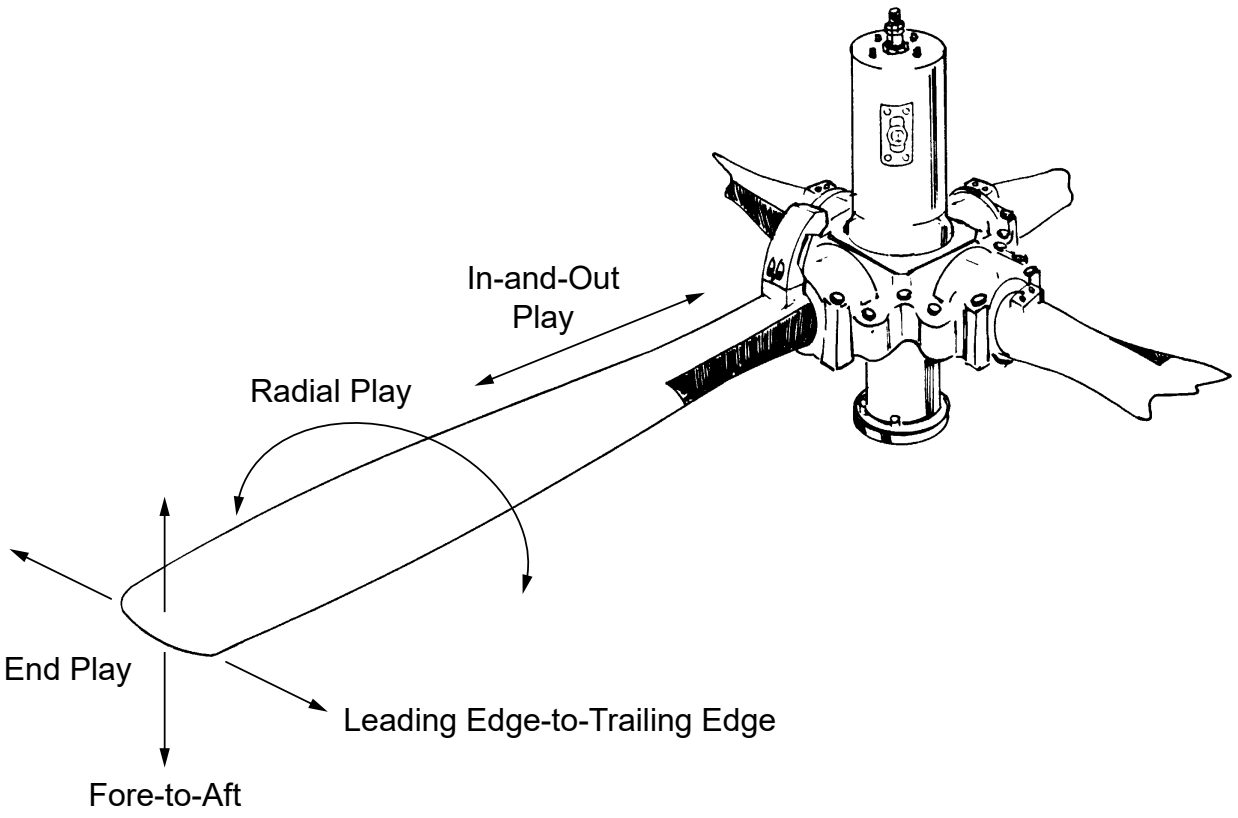
Problem	Probable Cause	Remedy
C. Abnormal Propeller Vibration	Bent, cracked, or damaged blade.	Refer to Hartzell Propeller Inc. Manual 133C (61-13-33) for aluminum blades. Refer to Hartzell Propeller Inc. Manual 135F (61-13-35) for composite blades.
	or Cracked or damaged hub.	Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	or Broken blade retention split bearings.	Replace the bearings and inspect the other blade retention components.
	or Grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.
D. Slight Vibration	Blades not tracking.	Refer to the problem, "Blades Not Tracking" in this chapter.
	or Static balance incorrect.	Refer to the Static and Dynamic Balance chapter in Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	or Dynamic balance incorrect.	Refer to the Static and Dynamic Balance chapter in Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02
	or Blade wear.	Refer to Hartzell Propeller Inc. Manual 133C (61-13-33) for aluminum blades. Refer to Hartzell Propeller Inc. Manual 135F (61-13-35) for composite blades.
	or Grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.

Problem	Probable Cause	Remedy
E. Surging RPM or Torque	Excessive friction in the pitch change mechanism.	Refer to the problem, "Friction" in this chapter.
	or Air is trapped in the propeller actuating piston or in the engine shaft.	After propeller installation and before each flight, exercise the propeller by changing pitch or feathering. The engine should have a provision for the trapped air to escape from the system during one-half of the pitch cycle.
	or Governor problem.	Refer to the airframe or the engine manufacturer's maintenance manual for installation instructions.
	or Beta ring runout is excessive, causing vibration of the carbon block.	Reset beta ring runout to specified limits. Refer to the Assembly chapter of this manual
	or Beta system rigging.	Refer to the airframe manufacturer's instructions.



Inspection for Leakage of Oil or Grease
Figure 1-1

Problem	Probable Cause	Remedy
F. Oil Leakage (Refer to Figure 1-1)	Faulty O-ring seal between the engine flange and the propeller mounting flange.	Remove the propeller from the engine and inspect the O-ring and the sealing surface. Replace the defective O-ring.
	or Faulty O-ring seal between the cylinder and the hub.	Remove the cylinder and inspect the O-ring and the sealing surface. Replace the defective O-ring.
	or for HC-E4A-3( ) Faulty O-ring seal between the piston and the cylinder, resulting in leakage from openings in the cylinder for beta system or between the reverse adjust sleeve and the cylinder.	Remove the cylinder and inspect the piston O-ring and cylinder sealing surface. Replace the defective O-ring.
	or for HC-(D,E)4(N,P)-3( ) Faulty O-ring seal between the piston and the cylinder, resulting in leakage from the start locks on the cylinder (if installed) or between the reverse adjust sleeve and the cylinder.	Remove the cylinder and inspect the piston O-ring and cylinder sealing surface. Replace the defective O-ring.
	or Faulty O-ring seal between the pitch change rod plug and the pitch change rod.	Remove the pitch change rod plug and inspect O-ring. Replace the defective O-ring.
	or Faulty O-ring seal between the pitch change rod and either hub half, resulting in leakage from the hub, beta rod holes and around the blade shanks.	Remove the lubrication fitting at the bottom of the hub and insert a wire. If oil runs out, then one or both O-rings are defective. Remove the propeller from the engine and disassemble. Inspect both O-rings and sealing surfaces. Replace the defective O-ring(s).
G. Grease Leakage (Refer to Figure 1-1) A new or newly overhauled propeller may leak slightly during the first several hours of operation. The leakage may be caused by the seating of seals and O-rings, and the slinging of lubricants used during assembly. Such leakage should cease within the first ten hours of operation.	Defective lubrication fitting.	Replace defective lubrication fittings.
	or Faulty seal at blade socket in hub.	Disassemble the propeller and inspect the seal and the sealing surface. Replace defective seal.
	or Too much grease was used for lubrication, resulting in leakage.	Disassemble the propeller and remove excess grease from the hubs.



NOTE: Blades should be tight in the propeller, however, play that is within the allowable limits is acceptable if the blade returns to its original position when released. If blade play is greater than the allowable limits, or if blade(s) do not return to their original position when released, there may be internal wear or damage that should be referred to a certified propeller repair station with the appropriate rating.

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Checking Blade Play
Figure 1-2

Problem	Probable Cause	Remedy
H. End-Play (Leading Edge to Trailing Edge) of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.	Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or Blade retention bearing (1040) is worn.	Follow Blade Retention Split Bearing Inspection and Replacement Procedures.
	or Internal blade bearing is worn.	Disassemble the propeller, remove the blade, and inspect the bearing. Replace the worn bearing.
I. End-Play (Fore-and-Aft) of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.	Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or Blade retention bearing (1040) is worn.	Follow Blade Retention Split Bearing Inspection and Replacement Procedures.
	or Internal blade bearing is worn.	Disassemble the propeller, remove the blade, and inspect the bearing. Replace the worn bearing.
J. In-and-Out Play of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.	Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or Blade retention bearing (1040) is worn.	Follow Blade Retention Split Bearing Inspection and Replacement Procedures.
K. Excessive Radial Play of the Blade (backlash) Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.	Pitch change fork is worn.	Disassemble the propeller. Inspect and replace the fork, as required.
	or Pitch change cam follower (960) is worn.	Disassemble the propeller. Inspect and replace the cam follower, as required.

Problem	Probable Cause	Remedy
L. Blades Not Tracking Refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual for blade track tolerances.	Ground strike damage.	For aluminum blade repair procedures, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33). For composite blade repair procedures, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).
	or Blade twist is not correct.	For aluminum blade repair procedures, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

2. Lightning Strike on Hub or Blade (Rev. 2)

A. Before Further Flight

(1) In the event of a propeller lightning strike, an inspection is required before further flight.

(a) A lightning strike on the propeller usually leaves arcing damage on the hub or blade, as evidence of where it entered or left the propeller.

(b) Refer to the Special Inspections chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for lightning strike inspection criteria.

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AUTOMATIC TEST REQUIREMENTS (NOT APPLICABLE) (Rev. 1)

NOTE: In accordance with ATA iSpec 2200 specification, this space is reserved for automatic test requirements. Such requirements are not applicable to the Hartzell Propeller Inc. propellers included in this manual.

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DISASSEMBLY - CONTENTS

LIST OF FIGURES

1. Important Information (Rev. 3)

WARNING: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

A. Removing the Propeller

(1) Remove the propeller from the aircraft in accordance with the applicable Hartzell Propeller Inc. owner's manual.

B. Record Serial Numbers/Blade Location Before Disasssembly

(1) Make a record of the serial number and model number of the hub, blades, and any other serial-numbered parts and compare with the data in the propeller logbook.

(a) For the location of the serial number on the hub, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

CAUTION 1: DO NOT ETCH, SCRIBE, PUNCH MARK, OR SIMILARLY IDENTIFY PARTS IN ANY MANNER THAT MAY BE HARMFUL TO THE STRENGTH OR FUNCTION OF THE PROPELLER.

CAUTION 2: GRAPHITE ("LEAD") PENCIL MARKS WILL CAUSE CORROSION. ALL MARKS MADE ON PARTS MUST BE MADE WITH A CRAYON OR SOFT, NON-GRAPHITE PENCIL SUCH AS CM162.

(2) Before disassembly, use a crayon or soft, non-graphite pencil such as CM162 to number the blades counterclockwise from the propeller serial number impression stamped on the propeller hub unit.

(a) Make a record of each blade serial number and the socket/arm from which it was removed.

C. Ice Protection System (if applicable)

(1) If the propeller is equipped with an ice protection system supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80) for technical information about the applicable ice protection system.

(2) If the propeller is equipped with an ice protection system not supplied by Hartzell Propeller Inc., refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA) for technical information about the applicable ice protection system..

2. Beta Feedback Block Assembly

A. Disassembly
Refer to Figure 3-1.

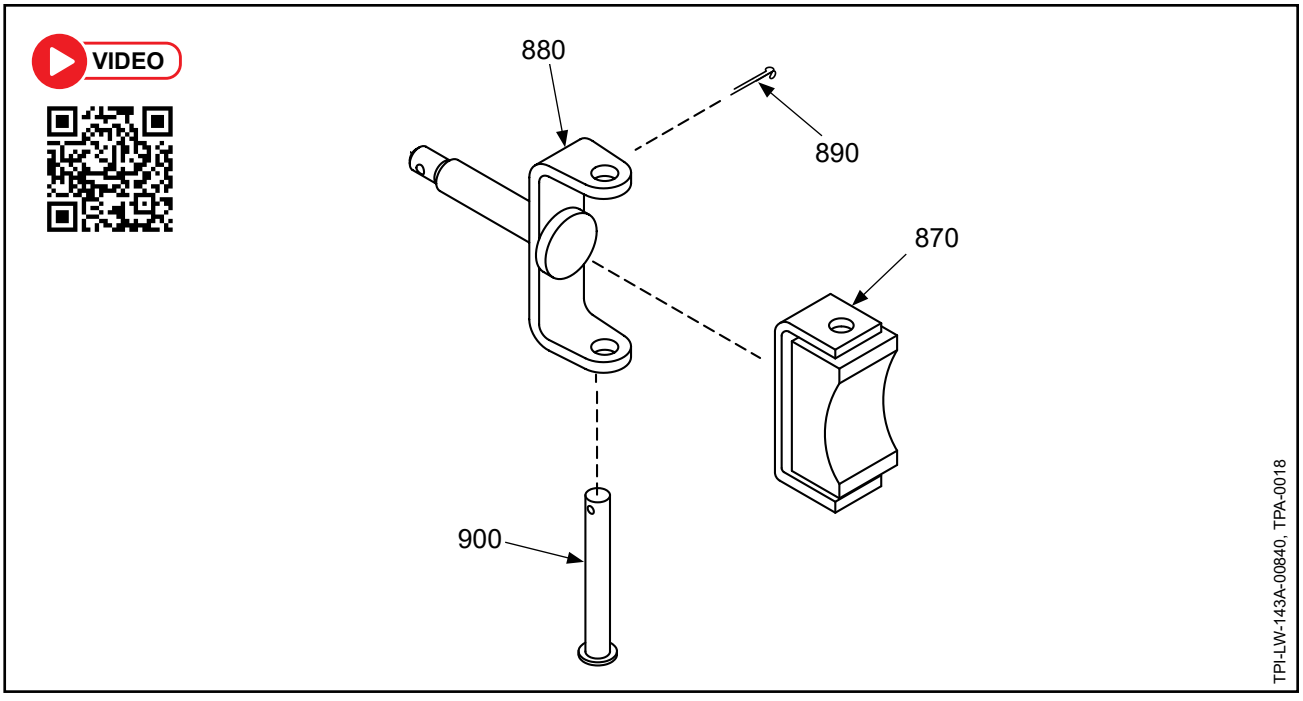
(1) Remove and discard the cotter pin (890) from the clevis pin (900).

(2) Remove and discard the clevis pin (900) from the yoke unit (880) and the carbon block unit (870).

(3) Remove and discard the carbon block unit (870) from the yoke unit (880).

(4) For beta feedback block assembly inspection serviceable limits, refer to the Check chapter in this manual.

(5) For beta feedback block assembly repair procedures, refer to the Repair chapter in this manual.



Beta Feedback Block Disassembly
Figure 3-1

3. Hub Disassembly

   A. All Propeller Models

      (1) Remove components of the hub unit/assembly (445/450) in accordance with the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

         (a) The inspection criteria for hub assembly components is located in the in the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

4. Blade Disassembly

   A. Propeller Blades

      (1) Remove and discard safety wire and silicone tubing (925), if applicable.

      (2) Remove and discard the two-piece seal energizer ring (1100) and the blade seal (1090) or the O-ring (1090) as applicable.

      (3) Remove the hub-side blade bearing race (1070).

      (4) Remove and discard the bearing balls (1060).

      (5) Remove and discard the ball spacer (1080).

      (6) Remove the preload plate (990).

      (7) Remove and discard the thin hex nut (1020) and set screw (1010) from the preload plate (990).

      (8) For an N-shank blade only:

         (a) Remove and discard the ball bearing (1104), if applicable.

         (b) Remove the blade plug (1103).

         (c) Remove the closed end needle bearing (1105), if applicable.

         (d) Remove and discard the O-ring (1102) from the blade plug (1103), if applicable.

      (9) Remove the blade seal (1035) from the butt of the blade, if applicable.

      (10) Remove and discard the blade seal O-ring (1036), if applicable.

      (11) Remove and discard the bolts (920) that attach the pitch change knob unit (930).

      (12) Remove the pitch change knob unit (930) from the blade using the following steps:

         (a) If the dowel pin (940) remains in the blade, remove and discard the dowel pin (940).

         (b) If the dowel pin (940) remains in the pitch change knob bracket (950), removal of the dowel pin (940) from the pitch change knob bracket (950) is not necessary.

(13) For a pitch change knob bracket (950) that uses a swaged washer (970) to retain the cam follower (960), remove the cam follower (960) from the pitch change knob bracket (950), using the following steps:

(a) Install puller TE98, or equivalent, so that the center post pushes on the pitch change knob bracket (950).

(b) Put the arms of the puller TE98, or equivalent, on the back of the cam follower (960).

(c) Turn in the handle of the puller TE98, or equivalent, to pull off the cam follower (960) and the washer (970).

(d) Discard the cam follower (960) and the washer (970).

(14) For a pitch change knob bracket (950) that uses a screw (973) to retain the cam follower (960), remove the cam follower (960) from the pitch change knob bracket (950), using the following steps and Figure 3-2:

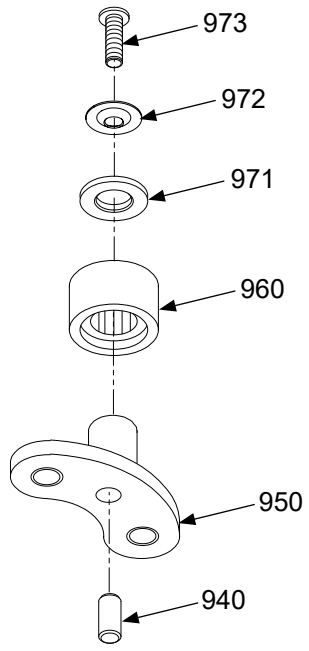
(a) Remove and discard the screw (973) from the end of the pitch change knob bracket (950).

(b) Remove and discard the dimpled washer (972).

(c) Remove the knob unit retaining washer (971).

(d) Remove and discard the cam follower (960).

VIDEO



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Pitch Change Knob Bracket Unit Disassembly
Figure 3-2

(15) Using an applicable gear puller or brass drift, remove the bearing retaining ring (1030).

(16) Remove the blade-side blade bearing race (1050) of the blade retention bearing (1040).

(17) For an N-shank composite blade, remove the blade plug (1103) using plug puller TE454.

(a) Remove and discard the blade plug O-ring (1102).

(18) For additional aluminum blade disassembly instructions, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(19) For additional composite blade disassembly instructions, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

5. Disassembly of HC-E4A-3( ) Propeller Models

WARNING: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF THE BLADE PITCH CHANGE MECHANISM. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE MECHANISM, CAUSING LOSS OF PITCH CONTROL DURING FLIGHT

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: USE COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE, OR NITROGEN TO ACTUATE THE PROPELLERS.

CAUTION 3: DO NOT USE MORE THAN 200 PSI (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 4: USE ENOUGH PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

A. Hub Balance Weight Removal

(1) Remove the safety wire from the balance weight screws or hex head bolts (1110), whichever is applicable.

(2) Remove and discard the balance weight screws or hex head bolts (1110), whichever is applicable.

(3) Remove the balance weights (1120).

B. Counterweight Removal

(1) Aluminum Blade Counterweight Removal

(a) Remove and discard all counterweight slug nuts (9042) and bolts (9041).

(b) Remove the counterweight slugs (9040).

(c) For counterweight removal instructions, refer to the Blade Shank Overhaul chapter of Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) Composite Blade Counterweight Clamp Removal

(a) For removal instructions, refer to the Overhaul chapter of Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

C. Beta System Disassembly

(1) Remove the safety wire between the drilled thin hex nuts (10,30) on each beta rod (750).

(2) Remove and discard the drilled thin hex nuts (10) from each beta rod (750).

(3) Remove and discard the screws (220) from each yoke tappet (210).

(4) Slide the beta yoke (20) off the beta rods (750) and cylinder (90), and remove from the propeller.

(5) Remove and discard the drilled thin hex nuts (30) from each beta rod (750).

(6) Remove both yoke tappets (210) and tappet bushings (200) from the cylinder (90).

WARNING: A SLIGHTLY COMPRESSED BETA COMPRESSION SPRING (800) WILL CAUSE THE SPRING TUBE (790) TO JUMP OFF OF THE HUB WHEN UNTHREADED FROM THE HUB.

(7) Unthread each spring tube (790) and remove from the hub (450).

(8) Remove and discard the beta compression spring (800) from each beta rod (750).

(9) Loosen each beta ring drilled thin hex nuts (820) while holding the beta rod (750) with a 1/4 inch open-end wrench on the flats of the opposite ends of the beta rod.

CAUTION: UNTHREAD THE BETA RODS (750) ALTERNATELY TO AVOID DAMAGE TO THE BETA RING (840).

(10) Remove the beta ring (840) from the beta rods (750) by rotating each beta rod with a 1/4 inch open-end wrench on the flats on the opposite end of the beta rod.

(11) Remove and discard the beta ring drilled thin hex nuts (820).

(12) Remove the beta rods (750) from the hub unit (450) through the cylinder-side of the hub (450).

D. Hydraulic System and Pitch Adjustment Unit Disassembly

(1) Remove and discard the hex head bolt (420), self-locking hex nut (400), and flat washer (410).

(2) Apply 200 psi (13.8 bar) air or oil pressure to the propeller to move the pitch change rod drilled thin hex nuts (40, 50) off the reverse adjust sleeve unit (280).

(3) Remove and discard the safety wire from the drilled thin hex nuts (40, 50) on the pitch change rod.

(4) Separate the drilled thin hex nuts (40, 50) from each other by rotating in opposite directions.

(5) Remove the drilled thin hex nuts (40, 50) from the pitch change rod (430).

(6) Release the air pressure from the propeller to reach maximum feather angle.

WARNING: PROPELLER BLADE ANGLE MUST BE AT FEATHER POSITION WITH ALL AIR PRESSURE RELEASED BEFORE CONTINUING DISASSEMBLY.

(7) If applicable, unthread the pitch change rod plug (70) and remove it from the pitch change rod (430).

(a) Remove and discard the O-ring (80) from the pitch change rod plug (70).

(8) Remove and discard the safety wire between the fillister head screw (100) on the cylinder (90) and the drilled thin hex nut (60) on the reverse adjust sleeve unit (280).

(9) Remove and discard the fillister head screw (100) and corrosion resistant washer (110) from the cylinder (90).

(10) Loosen and remove the drilled hex nut (60) from the reverse adjust sleeve unit (280).

WARNING: THE FEATHERING COMPRESSION SPRING IS PRELOADED TO APPROXIMATELY 600 POUNDS (271.8 kg) OF FORCE. FAILURE TO FULLY COMPRESS THE FEATHERING COMPRESSION SPRING INTO THE CYLINDER BEFORE CYLINDER REMOVAL COULD RESULT IN INJURY OR DEATH.

(11) Turn the reverse adjust sleeve unit (280) counterclockwise with a 1-3/16 inch open-end wrench on the flats, to fully compress the feathering compression spring (260).

NOTE: The feathering compression spring (260) will compress between the cylinder or forward spring retainer (250) and the plastic spring guide (270).

(12) Attach a cylinder wrench TE153 to the top of the cylinder (90).

(a) Install four (4) 1/4-28 UNF-3B screws through the wrench TE153 into the four threaded holes provided in the cylinder (90).

(13) Remove and discard both cylinder clamp screws (240), if applicable.

(14) Remove the cylinder clamp (230) halves, if applicable.

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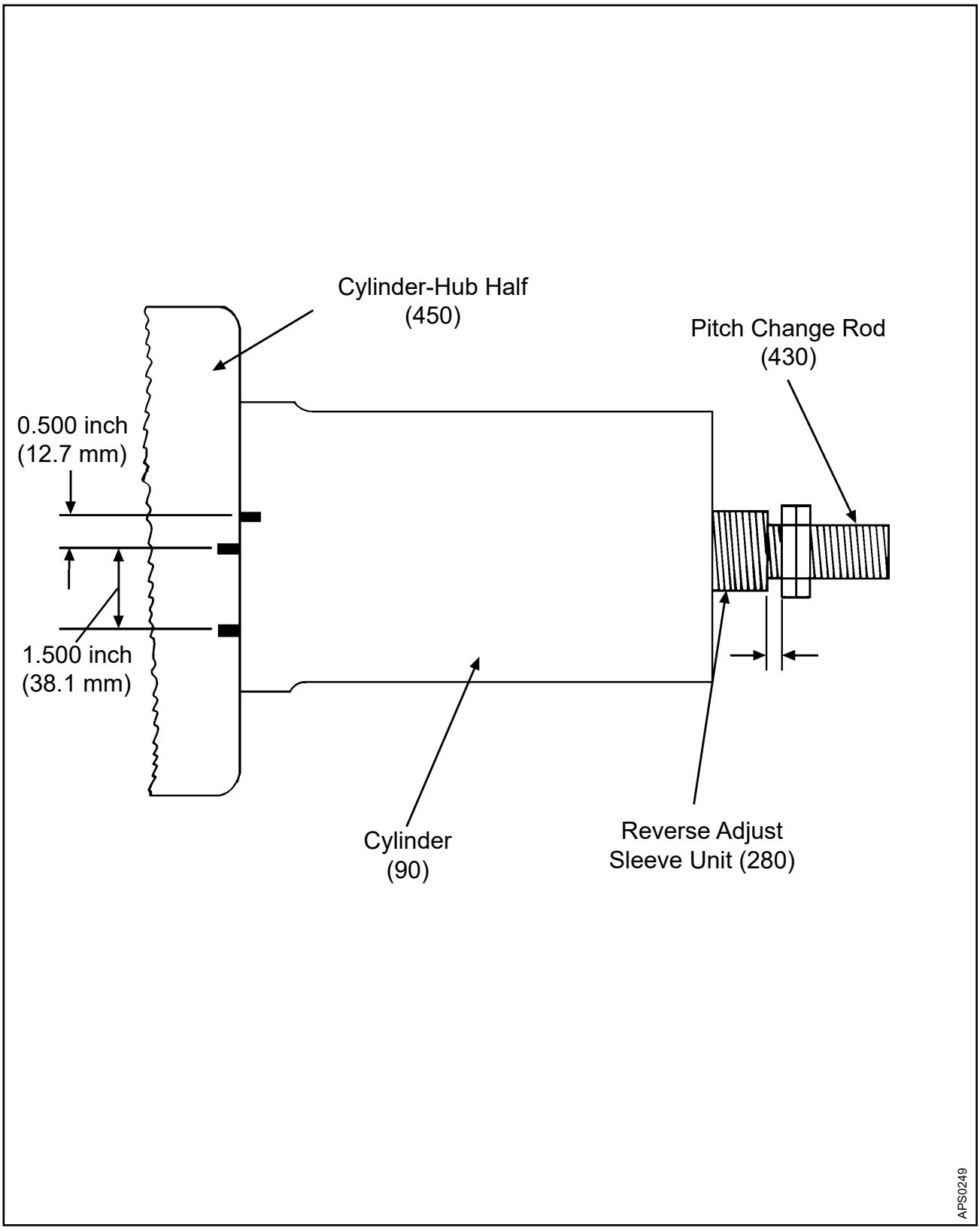


Cylinder Removal
Figure 3-3

WARNING: USE EXTREME CAUTION WHEN REMOVING THE CYLINDER AND FEATHERING COMPRESSION SPRING ASSEMBLY. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRING ASSEMBLY IS LOADED TO APPROXIMATELY 1800 POUNDS (815.4 kg) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE DISASSEMBLY PROCEDURES.

CAUTION: DO NOT DAMAGE THE CYLINDER THREADS WHEN REMOVING THE CYLINDER (90) FROM THE HUB (450).

(15) Removing the cylinder (90) from the hub (450).

(a) Using permanent ink, make a mark on the lower end of the cylinder (90), then make a mark on the hub (450) 0.500 inch (12.7 mm) counterclockwise from the mark on the cylinder. Make a second mark on the hub 1.500 inches (38.1 mm) counterclockwise from the first mark on the hub. Refer to Figure 3-3.

(b) Using a breaker bar, turn the cylinder (90) counterclockwise 0.500 inch (12.7 mm) until the mark on the cylinder lines up with the first mark on the hub (450).

CAUTION 1: ACTUAL TORQUE SETTINGS MUST BE CALCULATED TO INCLUDE THE LENGTH OF THE CYLINDER WRENCH. REFER TO THE TORQUE VALUES FORMULA IN FIGURE 8-1 OF THE FITS AND CLEARANCES CHAPTER OF THIS MANUAL.

CAUTION 2: MAKE SURE THAT THE TORQUE REQUIRED TO TURN THE CYLINDER THE REQUIRED 1.500 INCHES (38.1 mm) DOES NOT EXCEED 235 FT-LB (319 N•m).

(c) Using a calibrated torque wrench, apply 235 Ft-Lb (319 N•m) of corrected torque to the cylinder threads to turn the cylinder (90) counterclockwise 1.500 inches (38.1 mm) until the mark on the cylinder lines up with the second mark on the hub (450).

1 If the torque exceeds 235 Ft-Lb (319 N•m), refer to the Cylinder Removal section in the Repair chapter of this manual.

(d) If the torque required to turn the cylinder (90) an additional 1.500 inches (38.1 mm) did not exceed 235 Ft-Lb (319 N•m), reset the torque wrench to achieve an actual torque of 55 Ft-Lb (75 N•m).

CAUTION: MAKE SURE THAT THE TORQUE REQUIRED TO REMOVE THE CYLINDER DOES NOT EXCEED 55 FT-LB (75 N•m).

(e) Making sure that the torque does not exceed 55 FT-LB (75 N•m), turn the cylinder (90) counterclockwise to remove the cylinder from the hub (450).

1 If the torque required to remove the cylinder exceeds 55 Ft-Lb (75 N•m) actual torque, refer to the Cylinder Removal section in the Repair chapter of this manual.

(16) Lift the cylinder (90) and the retained feathering compression spring (260) off the pitch change rod (430) and put aside for further disassembly.

(17) Remove the four (4) 1/4-28 UNF-3B screws that hold the cylinder wrench TE153 to the cylinder (90) and remove the cylinder wrench.

(18) Rotate the reverse adjust sleeve unit (280) clockwise to extend the feathering compression spring (260) and unthread the reverse adjust sleeve unit from the cylinder (90).

NOTE: The feathering compression spring (260) will fully extend before the reverse adjust sleeve unit (280) unthreads from the cylinder (90).

(19) Remove the reverse adjust sleeve unit (280), plastic spring guide (270), feathering compression spring (260), and forward spring retainer (250), if applicable, from the cylinder (90).

(20) Using a modified deep well socket TE120 on the self-locking hex nut (310) and a modified deep well socket TE120 with a 1-3/8 inch crowfoot wrench, remove the pitch change rod (430) and piston (330) from the fork (680).

(a) If the self-locking hex nut (310) comes loose from the pitch change rod (430) and piston (330) before the pitch change rod comes loose from the fork (680), perform the following procedure:

1 Remove and discard the self-locking hex nut (310) from the pitch change rod (430).

2 Remove the piston (330) from the pitch change rod (430).

3 Using a 1-5/16 inch wrench on the wrenching flats, unthread and remove the pitch change rod (430) from the fork (680).

(b) If the pitch change rod (430) comes loose from the fork (680) before the self-locking hex nut (310) comes loose, perform the following procedures:

1 Remove the pitch change rod (430) with the self-locking hex nut (310) and piston (330) from the fork (680).

2 Insert the pitch change rod (430) through the piston unit installation socket TE228, fitting the socket over the shoulder flats on the pitch change rod.

3 Put the modified deep well socket TE120 on the self-locking hex nut (310).

4 Engage the modified deep well socket TE120 with a 1-3/8 inch crowfoot wrench.

5 Remove and discard the self-locking hex nut (310) from the pitch change rod (430).

6 Remove the piston (330) from the pitch change rod (430).

(21) Remove and discard the piston dust seal (380), piston OD O-ring (390), and piston ID O-ring (370).

(22) Remove and discard the cylinder mounting O-ring (440) from the cylinder-half hub shoulder.

(23) Remove all hex head bolts (570, 580), flat washers (590), and self-locking nuts (600) from the hub unit (450).

(24) Discard all flat washers (590) and self-locking nuts (600).

CAUTION 1: DO NOT DAMAGE THE BLADE WHEN TRYING TO SEPARATE THE HUB HALVES.

CAUTION 2: IF THE PROPELLER IS EQUIPPED WITH AN ICE PROTECTION SYSTEM, DO NOT TAP THE BLADE IN THE BOOT AREA.

(25) Using a soft mallet, lightly tap a blade to loosen and separate the halves of the hub unit (450).

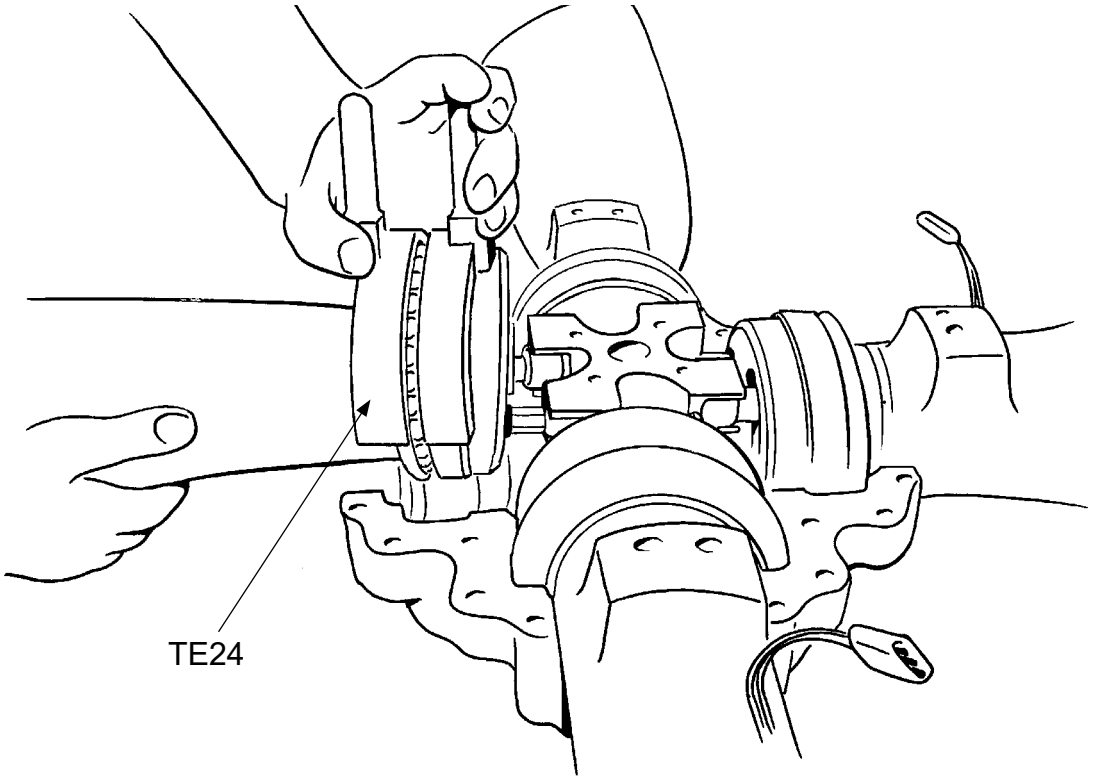
CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO PRY THE HUB HALVES (450) APART.

(26) Using a plastic wedge TE138, or similar tool, gently pry apart the hub halves (450).

CAUTION: DO NOT PERMIT THE BLADE ASSEMBLIES TO FALL OUT OF THEIR SOCKETS WHEN THE CYLINDER-SIDE HALF OF THE HUB UNIT IS REMOVED.

(27) Remove the cylinder-side hub half of the hub unit (450).

(28) Remove and discard the cylinder-side hub half O-ring (460) that seals between the hub unit (450) and pitch change rod (430).



Removing Blades from the Hub
Figure 3-4

(29) Using blade clamp TE24, if desired, remove two adjacent blade assemblies from the fork (680) and hub half (450). Refer to Figure 3-4.

(30) Remove the fork unit (670).

(31) Remove the two remaining blade assemblies from the hub half (450).

(32) Remove and discard the engine-side hub half O-ring (560) that seals between the hub unit (450) and pitch change rod (430).

(33) Remove and discard the cylinder-side hub half O-ring (760) that seals between the hub unit (450) and pitch change rod (430).

(34) Remove and discard the spinner bulkhead mounting bolts and washers.

NOTE: This permits the engine-side spinner bulkhead unit to drop clear of the engine-side hub half that remains on the rotatable fixture.

(35) Remove the engine-side hub half (450) from the rotatable fixture.

(36) Remove the spinner bulkhead from the rotatable fixture bench.

E. Pitch Change Fork Disassembly

(1) Using a 3/8 inch wrench, unthread and remove the bumper extension (690) from each fork arm.

CAUTION: DO NOT DAMAGE THE BUMPER EXTENSION (690) WHEN REMOVING THE FORK BUMPER (700).

(2) Remove and discard the fork bumper (700) from each bumper extension (690).

6. Disassembly of HC-( )4(N,P)-3( ) and HC-E4W-3( ) Propeller Models

WARNING: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF THE BLADE PITCH CHANGE MECHANISM. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE MECHANISM, CAUSING LOSS OF PITCH CONTROL DURING FLIGHT.

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: USE COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE, OR NITROGEN TO ACTUATE THE PROPELLERS.

CAUTION 3: DO NOT USE MORE THAN 200 PSI (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 4: USE ENOUGH PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

A. Hub Balance Weight Removal

(1) Remove the safety wire from the balance weight screws (1110).

(2) Remove and discard the balance weight screws (1110).

(3) Remove the balance weights (1120).

B. Counterweight Removal

(1) Aluminum Blade Counterweight Removal

(a) Remove and discard all counterweight nuts (9042) and bolts (9041).

(b) Remove the counterweight slugs (9040).

(c) For counterweight removal instructions, refer to the Blade Shank Overhaul chapter of Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) Composite Blade Counterweight Clamp Removal

(a) For removal instructions, refer to the Overhaul chapter of Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

C. Beta System Disassembly

CAUTION: MOVE THE PROPELLER TO THE FEATHER POSITION BEFORE BEGINNING DISASSEMBLY.

(1) Using a 1/4 inch open-end wrench, engage the flats on the cylinder-end of the beta rods (750) and loosen the drilled thin hex nuts (730).

(2) Remove and discard the drilled thin hex nuts (730).

(3) Remove the threaded beta sleeve (740) from each beta rod (750).

(4) Loosen the beta ring drilled thin hex nuts (820).

CAUTION: UNTHREAD THE BETA RODS (750) ALTERNATELY TO AVOID DAMAGE TO THE BETA RING (840).

(5) Using a 1/4 inch open-end wrench on the flats on the cylinder-end of the beta rods (750), unthread the beta rods (750) from the beta ring (840).

(6) Remove the beta ring (840) from the beta rods (750).

(7) Remove the beta ring drilled thin hex nuts (820), spacer (815) if applicable, and washers (810).

(a) Optionally, use the spring installation tool TE658 to compress the beta compression spring (800) before removing the hex nuts (820). Refer to the section, "Spring Installation Tool" in this chapter.

(8) Discard the beta ring drilled thin hex nuts (820) and washers (810).

(9) Remove the beta compression spring (800) and beta sleeve (790).

(10) Discard the beta compression spring (800).

(11) Remove the beta rods (750) from the hub unit (450) through the cylinder-side of the hub unit.

D. Hydraulic System and Pitch Adjustment Unit Disassembly

(1) Remove and discard the hex head bolt (420), self-locking hex nut (400), and flat washer (410).

(2) Start Lock Disassembly, if applicable

(a) Remove and discard the cotter pin (135) and clevis pin (130), if present.

(b) Remove the start lock spring (180) and start lock pin (160).

(c) Discard the start lock spring (180).

(d) Remove and discard the socket head cap screws (170) that attach the start lock housing cover (150) to the cylinder (90).

(e) Remove the start lock housing cover (150).

(f) Remove the start lock housing (140).

(g) Remove and discard the socket set screws (120) from the cylinder.

(h) Repeat the start lock disassembly procedure for the opposite start lock.

(3) Apply 200 psi (13.8 bar) air or oil pressure to the propeller to move the pitch change rod drilled thin hex nuts (40, 50) off the reverse adjust sleeve unit (280).

(4) Remove and discard the safety wire from the drilled thin hex nuts (40, 50) on the pitch change rod.

(5) Separate the drilled thin hex nuts (40, 50) from each other, by rotating in opposite directions.

(6) Remove the drilled thin hex nuts (40, 50) from the pitch change rod (430).

(7) Release the air (or oil) pressure from the propeller to move the blades to maximum feather angle.

WARNING: PROPELLER BLADE ANGLE MUST BE AT FEATHER POSITION WITH ALL AIR PRESSURE RELEASED BEFORE CONTINUING DISASSEMBLY.

(8) Unthread the pitch change rod plug (70) and remove from the pitch change rod (430).

(9) Remove and discard the safety wire between the fillister head screw (100) on the cylinder (90) and drilled thin hex nut (60) on the pitch change rod (430).

(10) Remove and discard the fillister head screw (100) and corrosion resistant washer (110) from the cylinder (90).

(11) Loosen and remove the drilled thin hex nut (60) from the reverse adjust sleeve unit (280).

WARNING: THE FEATHERING COMPRESSION SPRING IS PRELOADED TO APPROXIMATELY 600 POUNDS (271.8 kg) OF FORCE. FAILURE TO FULLY COMPRESS THE FEATHERING COMPRESSION SPRING INTO THE CYLINDER BEFORE CYLINDER REMOVAL COULD RESULT IN INJURY OR DEATH.

(12) Turn the reverse adjust sleeve unit (280) counterclockwise with a 1 3/16 inch open-end wrench on the flats to fully compress the feathering compression spring (260).

NOTE: The feathering compression spring (260) will compress between the cylinder or forward spring retainer (250) and the plastic spring guide (270).

(13) Attach a cylinder wrench TE153 to the top of the cylinder (90).

(a) Install four (4) 1/4-28 UNF-3B screws through the wrench TE153 into the four threaded holes provided in the cylinder (90).

WARNING: USE EXTREME CAUTION WHEN REMOVING THE CYLINDER AND FEATHERING COMPRESSION SPRING ASSEMBLY. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRING ASSEMBLY IS LOADED TO APPROXIMATELY 1800 POUNDS (815.4 kg) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE DISASSEMBLY PROCEDURES.

CAUTION: DO NOT DAMAGE THE CYLINDER THREADS WHEN REMOVING THE CYLINDER (90) FROM THE HUB (450).

(14) Removing the cylinder (90) from the hub (450).

(a) Using permanent ink, make a mark on the lower end of the cylinder (90), then make a mark on the hub (450) 0.500 inch (12.7 mm) counterclockwise from the mark on the cylinder. Make another mark on the hub 1.500 inches (38.1 mm) counterclockwise from the first hub marking. Refer to Figure 3-3.

(b) Using a breaker bar, turn the cylinder (90) counterclockwise 0.500 inch (until the mark on the cylinder lines up with the first mark on the hub [450]).

CAUTION 1: ACTUAL TORQUE SETTINGS MUST BE CORRECTED TO INCLUDE THE LENGTH OF THE CYLINDER WRENCH USING THE TORQUE VALUES FORMULA IN FIGURE 8-1 OF THE FITS AND CLEARANCES CHAPTER OF THIS MANUAL.

CAUTION 2: MAKE SURE THAT THE TORQUE REQUIRED TO TURN THE CYLINDER THE REQUIRED 1.500 INCHES (38.1 mm) DOES NOT EXCEED 235 FT-LB (319 N•m).

(c) Using a calibrated torque wrench, apply 235 Ft-Lb (319 N•m) of corrected torque to the cylinder threads to turn the cylinder (90) counterclockwise 1.500 inches (38.1 mm) until the mark on the cylinder lines up with the second mark on the hub (450).

1 If the torque required to turn the cylinder exceeds 235 Ft-Lb (319 N•m), refer to the Cylinder Removal section in the Repair chapter of this manual.

(d) If the torque required to turn the cylinder (90) an additional 1.500 inches (38.1 mm) did not exceed 235 Ft-Lb (319 N•m), reset the torque wrench to achieve an actual torque of 55 Ft-Lb (75 N•m).

CAUTION: MAKE SURE THAT THE TORQUE REQUIRED TO REMOVE THE CYLINDER DOES NOT EXCEED 55 FT-LB (75 N•m).

(e) Making sure that the torque does not exceed 55 FT-LB (75 N•m), turn the cylinder (90) counterclockwise to remove the cylinder from the hub (450).

1 If the torque required to remove the cylinder exceeds 55 Ft-Lb (75 N•m) actual torque, refer to the Cylinder Removal section in the Repair chapter of this manual.

(15) Lift the cylinder (90) and the retained feathering compression spring (260) off the pitch change rod (430) and put aside for further disassembly.

(16) Remove the four (4) 1/4-28 UNF-3B screws that hold the cylinder wrench TE153 to the cylinder (90) and remove the cylinder wrench.

(17) Rotate the reverse adjust sleeve unit (280) clockwise to extend the feathering compression spring (260) and unthread the reverse adjust sleeve unit from the cylinder (90).

NOTE: The feathering compression spring (260) will fully extend before the reverse adjust sleeve unit (280) unthreads from the cylinder (90).

(18) Remove the reverse adjust sleeve unit (280), plastic spring guide (270), feathering compression spring (260), and forward spring retainer (250), if applicable, from the cylinder (90).

(a) For series HC-D4( )-3( ):

CAUTION: DO NOT REMOVE THE BUSHING AT THE THREADED END OF THE REVERSE ADJUST SLEEVE.

1 Early versions of the reverse adjust sleeve unit (280) contained two internal bushings (300). The bushing at the threaded end of the reverse adjust sleeve unit must stay in position.

2 Remove the bushing in the unthreaded portion of the reverse adjust sleeve unit, if not already done.

NOTE: If the propeller contains the C-447 feathering compression spring (260), B-442 plastic spring guide (270), and B-476 pitch adjust sleeve unit (280), the forward spring retainer (250) will not exist. If the propeller contains a B-6768 forward spring retainer (250), it will also contain a C-6760 feathering compression spring (260), B-6761 plastic spring guide (270), and B-6758 pitch adjust sleeve unit (280).

(19) Using a modified deep well socket TE120 on the self-locking hex nut (310) and a modified deep well socket TE120 with a 1-3/8 inch crowfoot wrench, remove the pitch change rod (430) and piston (330), or piston unit (320) if applicable, from the fork (680).

(a) If the self-locking hex nut (310) comes loose from the pitch change rod (430) and piston (330), or piston unit (320) if applicable, before the pitch change rod comes loose from the fork (680), do the following procedures:

1 Remove and discard the self-locking hex nut (310) from the pitch change rod (430).

2 Remove the piston (330), or piston unit (320) if applicable, from the pitch change rod (430).

3 Using a 1-5/16 inch wrench on the wrenching flats, unthread and remove the pitch change rod (430) from the fork (680).

(b) If the pitch change rod (430) comes loose from the fork (680) before the self-locking hex nut (310) comes loose, do the following procedures:

1 Remove the pitch change rod (430) with the self-locking hex nut (310) and piston (330), or piston unit (320) if applicable, from the fork (680).

2 Insert the pitch change rod (430) through the piston unit installation socket TE228, fitting the socket over the shoulder flats on the pitch change rod.

3 Put the modified deep well socket TE120 on the self-locking hex nut (310).

4 Engage the modified deep well socket TE120 with a 1-3/8 inch crowfoot wrench.

5 Remove and discard the self-locking hex nut (310) from the pitch change rod (430).

6 Remove the piston (330) from the pitch change rod (430).

(20) Remove and discard the piston dust seal (380), piston OD O-ring (390), and piston ID O-ring (370).

(21) Remove and discard the cylinder mounting O-ring (440) from the cylinder-half hub shoulder.

(22) Remove all hex head bolts (570, 580), flat washers (590), and self-locking hex nuts (600) from the hub unit (450).

(23) Discard all flat washers (590) and self-locking hex nuts (600).

CAUTION: IF THE PROPELLER IS EQUIPPED WITH AN ICE PROTECTION SYSTEM, DO NOT TAP THE BLADE IN THE BOOT AREA.

(24) With a soft mallet, lightly tap the end of one blade to loosen and separate the halves of the hub unit (450).

CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO PRY THE HUB HALVES (450) APART.

(25) Using a plastic wedge TE138, or equivalent tool, gently pry apart the hub halves (450).

CAUTION: DO NOT PERMIT THE BLADE ASSEMBLIES TO FALL OUT OF THEIR SOCKETS WHEN THE CYLINDER-SIDE HALF OF THE HUB UNIT IS REMOVED.

(26) Remove the cylinder-side hub half of the hub unit (450).

(27) Remove and discard the cylinder-side hub half O-ring (460) that seals between the hub unit (450) and pitch change rod (430).

(28) Using blade clamp TE24, if necessary, remove two adjacent blade assemblies from the fork (680) and hub half (450). Refer to Figure 3-3.

(29) Remove the fork unit (670).

(30) Remove the two remaining blade assemblies from the hub half (450).

(31) Remove and discard the engine-side hub half O-ring (560) that seals between the hub unit (450) and pitch change rod (430).

(32) Remove and discard the cylinder-side hub half O-ring (760) that seals between the hub unit (450) and pitch change rod (430).

(33) Remove and discard the spinner bulkhead mounting bolts and washers.

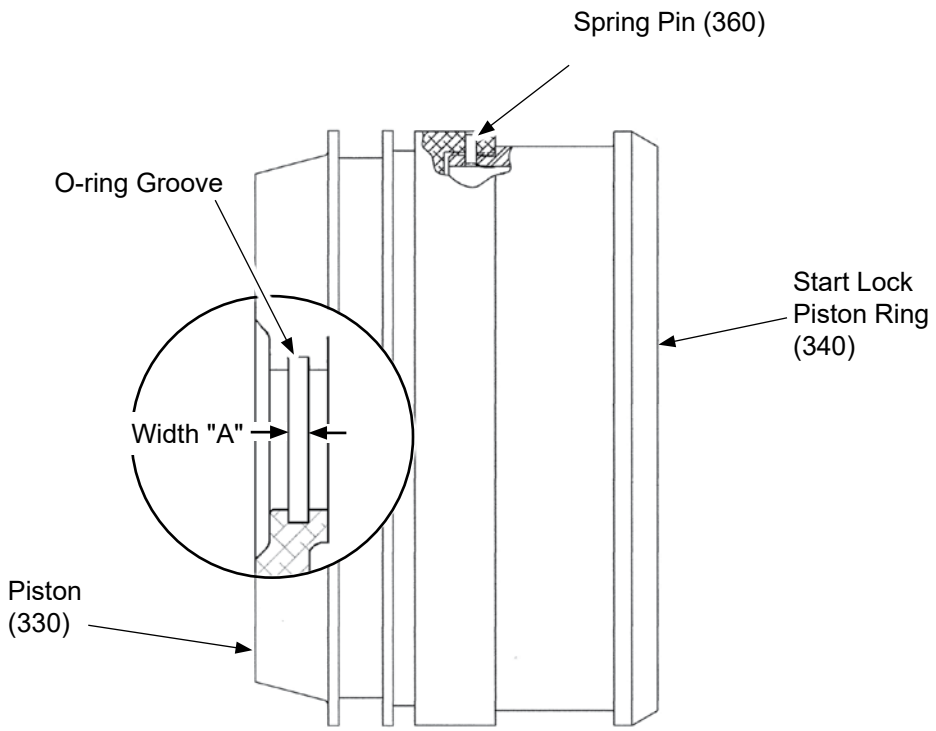
NOTE: This permits the engine-side spinner bulkhead unit to drop clear of the engine-side hub half, which remains on the rotatable fixture.

(34) Remove and discard the beta spring retainer O-ring (770) from each beta spring retainer (780).

(35) Using a soft mallet, drive each beta spring retainer (780) out of the engine-side hub half.

(36) Remove the engine-side hub half (450) from the rotatable fixture.

(37) Remove the spinner bulkhead from the rotatable fixture bench.



Piston Unit C-497
Figure 3-5

E. Disassembling the Piston Unit C-497( ) (320)

(1) Measure and make a record of the O-ring groove width "A" on the piston (330). Refer to Figure 3-5.

(a) This measurement is necessary to complete step 6.I.(12).

(2) Remove and discard the spring pin (360) from the piston unit (320). Refer to Figure 3-5.

(3) Put the clamp base TE618 in a vise. Refer to Figure 3-6.

(4) Attach the piston unit (320) to the clamp base TE618.

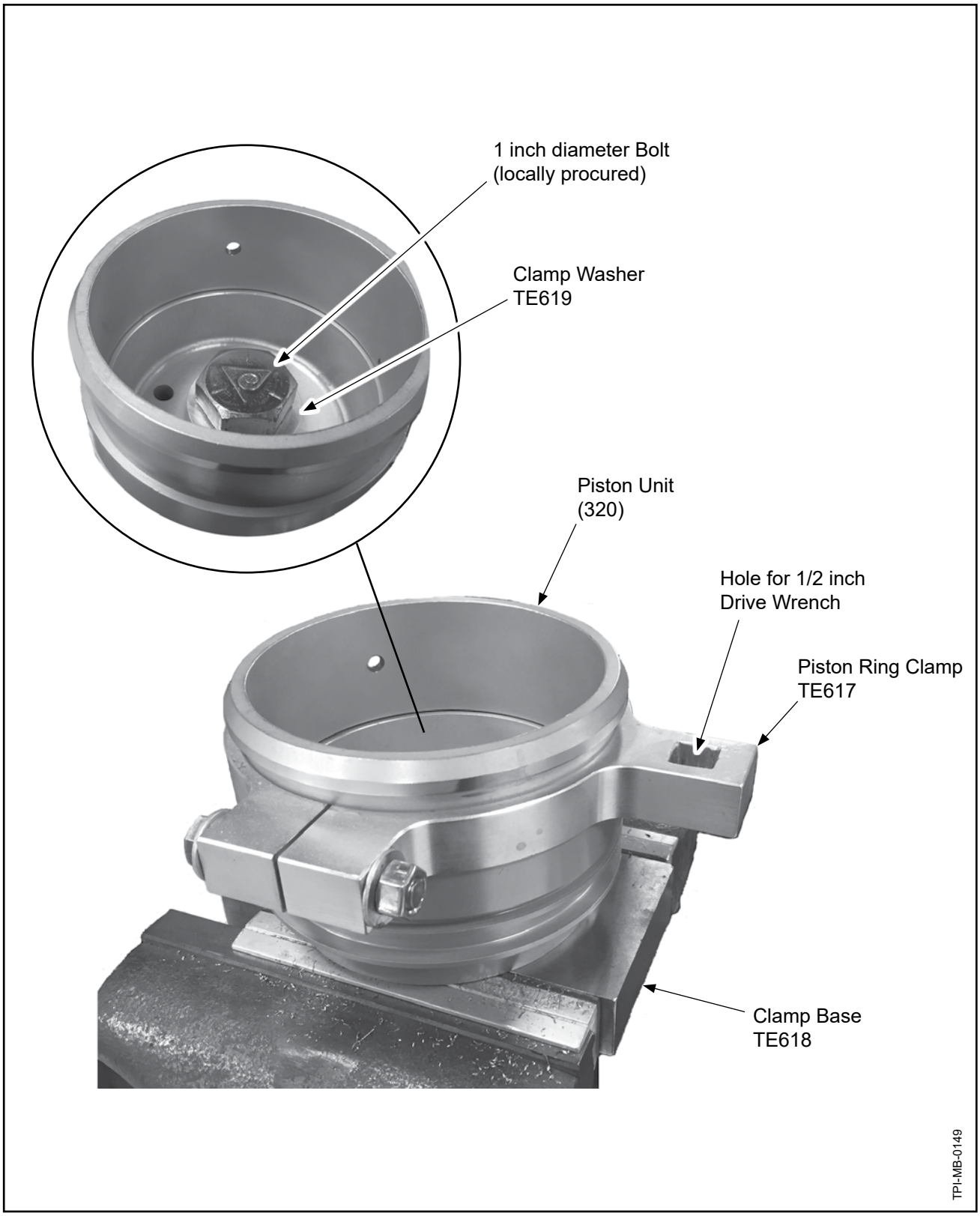
(a) Install the clamp washer TE619 onto a locally procured 1 inch (25.4 mm) diameter bolt.

(b) Put the bolt with the clamp washer TE619 through the piston unit (320) and the clamp base TE618, as shown in Figure 3-6.

(c) Install a locally procured nut of the appropriate size onto the 1 inch (25.4 mm) diameter bolt.

CAUTION: DO NOT OVERTIGHTEN THE LOCALLY PROCURED NUT. THE MAXIMUM TORQUE IS 200 FT-LBS (271 N•m). OVERTIGHTENING THE NUT MAY COMPRESS THE O-RING GROOVE AND DAMAGE THE PISTON (330).

(d) Tighten the nut to prevent the piston unit (320) from rotating on the clamp base TE618.



Using the Piston Ring Clamp TE617
Figure 3-6

(5) Install the piston ring clamp TE617 on the piston unit (320), as shown in Figure 3-6.

(6) Remove the clamp base TE618 and the piston unit (320) with the piston ring clamp TE617 installed, from the vise.

CAUTION: DO NOT HEAT THE PISTON UNIT (320) TO MORE THAN 180°F (82°C).

(7) Heat the piston unit (320) to 180°F (82°C), then immediately put the clamp base TE618 and the piston unit (320) with the piston ring clamp TE617 installed, in a vise as shown in Figure 3-6.

(a) While the piston unit (320) is hot, use a 1/2 inch drive wrench in the hole on the piston ring clamp TE617 to separate the start lock piston ring (340) from the piston (330).

1 A breaker bar or adapter can be used when separating the start lock piston ring (340) from the piston (330).

2 If the piston unit (320) cannot be separated, retire the piston unit (320) in accordance with the Part Retirement chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(8) Let the parts cool.

(9) Remove the piston ring clamp TE617 from the start lock piston ring (340).

(10) Remove the clamp base TE618 from the piston (330).

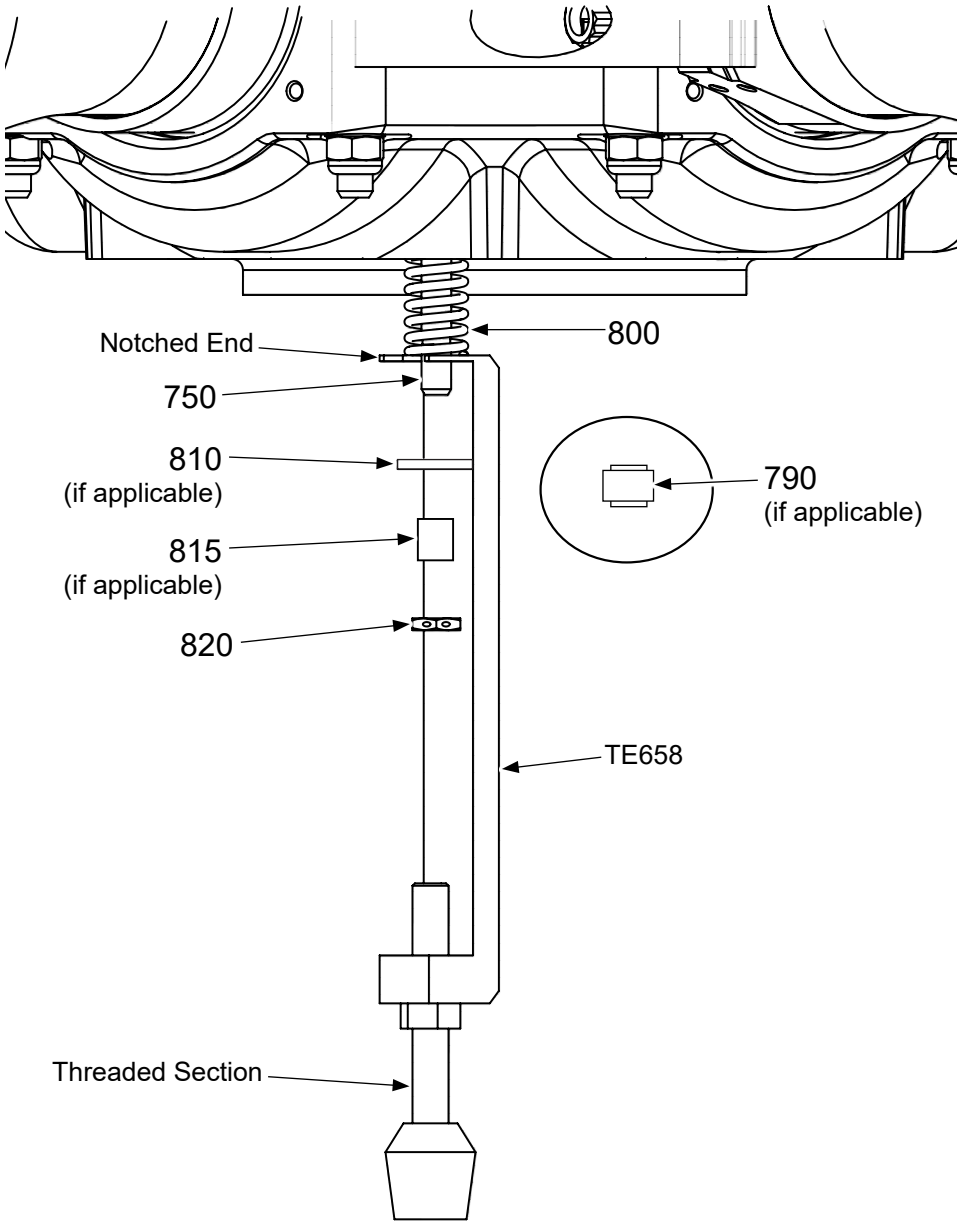
(11) Measure and make a record of the O-ring groove width "A" on the piston (330). Refer to Figure 3-5.

(12) Subtract the width "A" measured in step (11) from the width "A" measured in step (1) in this section.

(a) If the difference between the two width "A" measurements is greater than 0.002 inch (0.05 mm), retire the piston (330) in accordance with the Part Retirement chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) If the difference between the two width "A" measurements is less than or equal to 0.002 inch (0.05 mm), go to step (13) in this section.

(13) Using solvent CM106 MEK or CM219 MPK, clean the start lock piston ring (340) and the piston (330) to remove any remaining adhesive.



Spring Installation Tool
Figure 3-7

F. Pitch Change Fork Disassembly

(1) Using a 3/8 inch wrench, unthread and remove the bumper extension (690) from each fork arm.

CAUTION: DO NOT DAMAGE THE BUMPER EXTENSION (690) WHILE REMOVING THE FORK BUMPER (700).

(2) Remove and discard the fork bumper (700) from each bumper extension (690).

(3) Remove and discard the screws (720) that hold the beta pickup plate (710).

(4) Remove the beta pickup plate (710) from the fork (680).

7. Spring Installation Tool

A. Using a Spring Installation Tool

(1) Put the notched end of the spring installation tool TE658 onto the beta rod (750) between the beta compression spring (800) and the spacer (815), washer (810), or spring guide (790) as applicable. Refer to Figure 3-7.

(2) Adjust the threaded section of the spring installation tool TE658 until it compresses the beta compression spring (800).

(3) Remove and discard the drilled thin hex nuts (820).

(4) Remove the spring installation tool TE658 from the beta rod, then complete the assembly steps in the applicable procedure.

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CLEANING - CONTENTS

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1. Cleaning Procedures (Rev. 4)

A. General Cleaning

(1) Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

B. Cleaning Steel Parts for Magnetic Particle Inspection

(1) Refer to the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Cleaning Steel Parts for Cadmium Replating Procedures

(1) Refer to the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

D. Cleaning Aluminum Parts for Penetrant Inspection

(1) Refer to the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

E. Cleaning Titanium Parts for Penetrant Inspection

(1) Refer to the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

F. Cleaning Aluminum Parts for Chromic Acid Anodizing Procedures

(1) Refer to the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

G. Cleaning Cylinder Threads (Propellers with screw-on cylinders only)

(1) It is preferable that the cylinder threads be cleaned only with solvent CM23; however, removal of sealant in the threaded area can be difficult.

CAUTION: DO NOT USE GLASS BEAD OR OTHER ABRASIVE CLEANING METHODS, AS THEY MAY CAUSE EXCESSIVE DAMAGE TO THE CYLINDER THREADS.

(2) Use plastic media in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) to remove the sealant from the cylinder threads.

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CHECK - CONTENTS

CHECK - CONTENTS, CONTINUED

CHECK - CONTENTS, CONTINUED

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LIST OF FIGURES, CONTINUED

LIST OF TABLES

1. Inspection Interval Requirements (Rev. 1)
   A. General
      (1) For information about life limited components and mandatory inspections, refer to the Airworthiness Limitations chapter of the applicable Hartzell Propeller Inc. owner's manual.
      (2) For overhaul periods of Hartzell Propeller Inc. propellers, refer to Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.
2. Dimensional Inspection (Rev. 1)
   A. Diameter Measurements
      (1) When measuring the diameter of a part with a two point measuring instrument, take at least two measurements unless specified differently.
         (a) Obtaining a measurement outside the specified tolerance at any point of measurement is cause for retirement of the part when a minimum of two measurements are taken.
         (b) Alternately, take eight evenly spaced measurements, unless specified differently.
            1 Obtaining a measurement outside the specified tolerance on three or more measurements is cause for retirement of the part when eight measurements are taken (two of eight measurements may be out of specified tolerance).
            2 This alternate method may not be used to accept a diameter that has obvious damage beyond repairable (serviceable) limits.
      (2) When measuring the diameter of a part with a three point measuring instrument, take one measurement. A measurement outside the specified tolerance is cause for retirement of the part.
   B. Decimal Places
      (1) Inspect the part features to the number of decimal places specified. If three decimal places are specified, inspect the part to three decimal places only.

3. Inspection Criteria/Procedures (Rev. 2)

A. Propeller Components (Except for those listed separately in this section)

(1) Refer to Table 5-1, "Component Inspection Criteria" in this chapter.

B. Hubs

(1) Aluminum Hubs: Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) Steel Hubs: Refer to the Steel Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Blades

(1) Aluminum Blades: Refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) Composite Blades: Refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

D. Ice Protection Systems

(1) For ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) For ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder’s Instructions for Continued Airworthiness (ICA).

E. Spinner Assemblies

(1) Metal Spinners: Refer to Hartzell Propeller Inc. Metal Spinner Maintenance Manual 127 (61-16-27).

(2) Composite Spinners: Refer to Hartzell Propeller Inc. Composite Spinner Maintenance Manual 148 (61-16-48).

F. Special Inspections (Lightning Strike, Foreign Object Strike, etc.)

(1) Refer to the Special Inspections chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

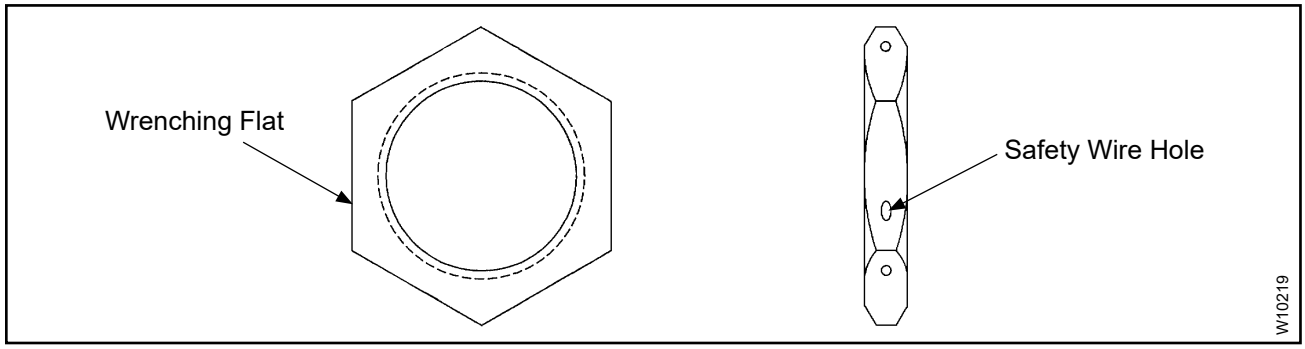
4. Propeller Component Checks

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

Refer to Table 5-1, "Component Inspection Criteria" in this chapter.

Component Inspection Criteria
Table 5-1

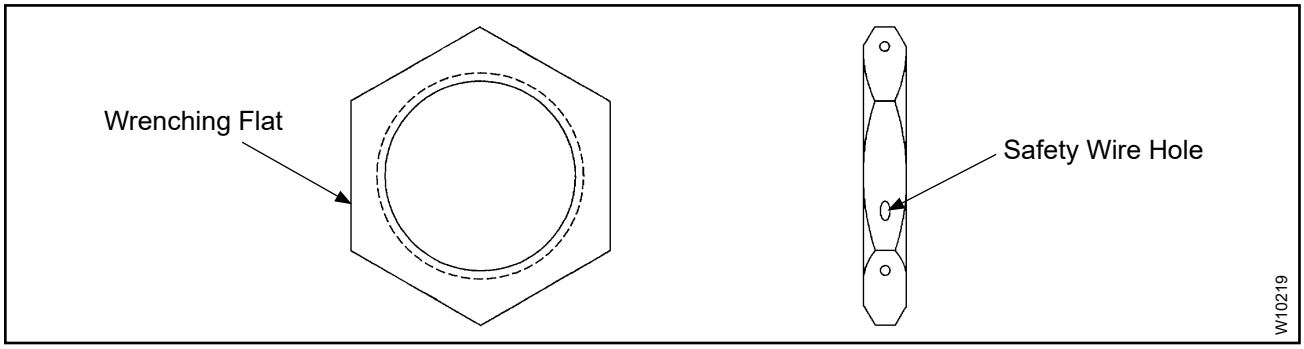
	Inspect	Serviceable Limits	Corrective Action
A.	DRILLED THIN HEX NUT (Item 40, 50) Refer to Figure 5-1.		
(1)	Visually examine each drilled thin hex nut for wrench damage.	Corners between the wrenching flats may be rounded. Two (2) wrenching flats must be sufficiently undamaged to withstand installation torque. Material may not be displaced above or below the nut that could result in interference with the mating parts.	File away unwanted material displacement. If a minimum of two (2) flats will not withstand installation torque, replace the drilled thin hex nut.
(2)	Visually examine each drilled thin hex nut for corrosion product and pitting on all surfaces.	Corrosion product is not permitted. Maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(3)	Visually examine each drilled thin hex nut for wear on surfaces other than the wrenching flats.	A maximum permitted depth of material loss is 0.005 inch (0.12 mm).	If the material loss is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(4)	Visually examine the safety wire holes.	Wrenching flat damage must not expose the holes and prevent retention of safety wire.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(5)	Visually examine the threads.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(6)	Visually examine the drilled thin hex nut for cadmium plate coverage.	Cadmium plating must be on all surfaces of the drilled thin hex nut.	Replate the drilled thin hex nut in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Drilled Thin Hex Nut
Figure 5-1

Component Inspection Criteria
Table 5-1

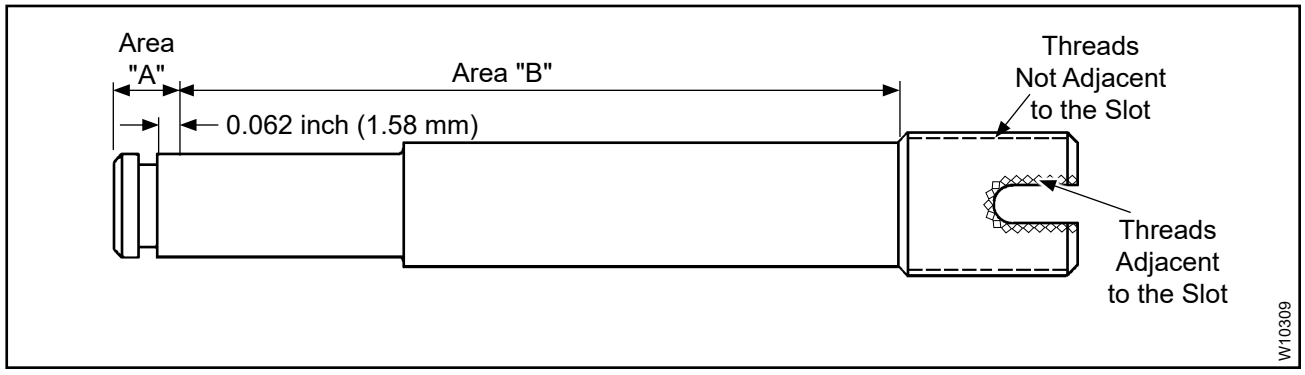
	Inspect	Serviceable Limits	Corrective Action
B.	DRILLED THIN HEX NUT (Item 60) Refer to Figure 5-2.		
(1)	Visually examine each drilled thin hex nut for wrench damage.	Corners between the wrenching flats may be rounded. Two (2) wrenching flats must be sufficiently undamaged to withstand installation torque. Material may not be displaced above or below the nut that could result in interference with the mating parts.	File away unwanted material displacement. If a minimum of two (2) flats will not withstand installation torque, replace the drilled thin hex nut.
(2)	Visually examine each drilled thin hex nut for corrosion product and pitting on all surfaces.	Corrosion product is not permitted. Maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(3)	Visually examine each drilled thin hex nut for wear on surfaces other than the wrenching flats.	A maximum permitted depth of material loss is 0.005 inch (0.12 mm).	If the material loss is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(4)	Visually examine the safety wire holes.	Wrenching flat damage must not expose the holes and prevent retention of safety wire.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(5)	Visually examine the threads.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(6)	Visually examine the drilled thin hex nut for cadmium plate coverage.	Cadmium plating must be on all surfaces of the drilled thin hex nut.	Replate the drilled thin hex nut in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Drilled Thin Hex Nut
Figure 5-2

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
C.	PITCH CHANGE ROD PLUG (Item 70) Refer to Figure 5-3.		
(1)	Visually examine the pitch change rod plug for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the pitch change rod plug.
(2)	Visually examine the threads of the pitch change rod plug that are not adjacent to the slot for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted. Damage must not prevent correct threading into the pitch change rod.	If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(3)	Visually examine the threads adjacent to the slot for damage.	Damage must not prevent correct threading into the pitch change rod.	Thread edges adjacent to the slot only may be filed to remove damage. If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(4)	Visually examine the non-threaded areas for damage, Area "A" and Area "B".	The maximum permitted depth of damage in Area "A" is 0.005 inch (0.12 mm). The maximum permitted depth of damage in Area "B" is 0.015 inch (0.38 mm).	If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(5)	Visually examine for cadmium plate coverage.	A few random scratches are permitted; otherwise, cadmium plate must cover the pitch change rod plug.	If coverage is less than the permitted serviceable limits, replate the pitch change rod plug in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Pitch Change Rod Plug
Figure 5-3

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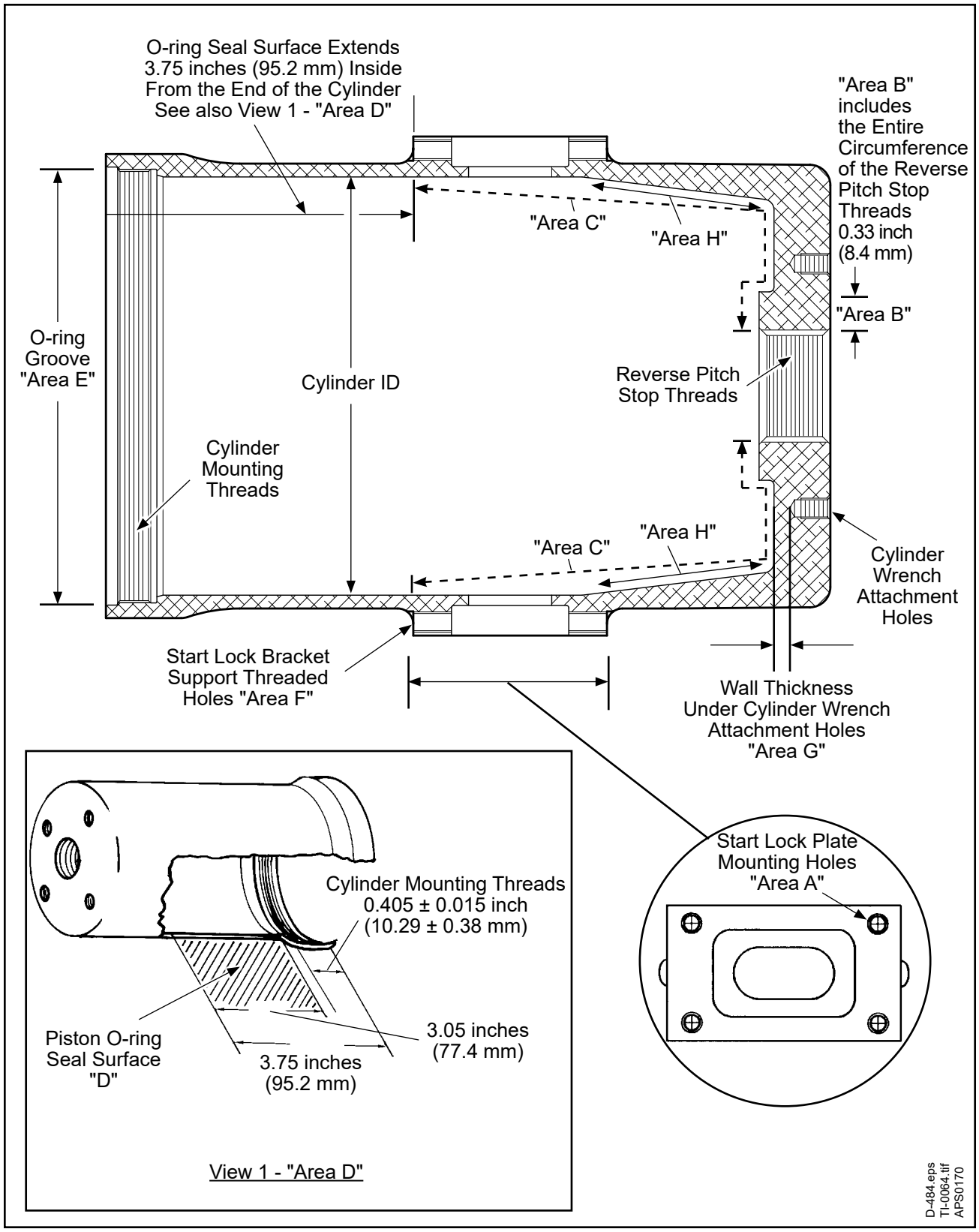


D-484-( ) Cylinder
Figure 5-4

Component Inspection Criteria
Table 5-1

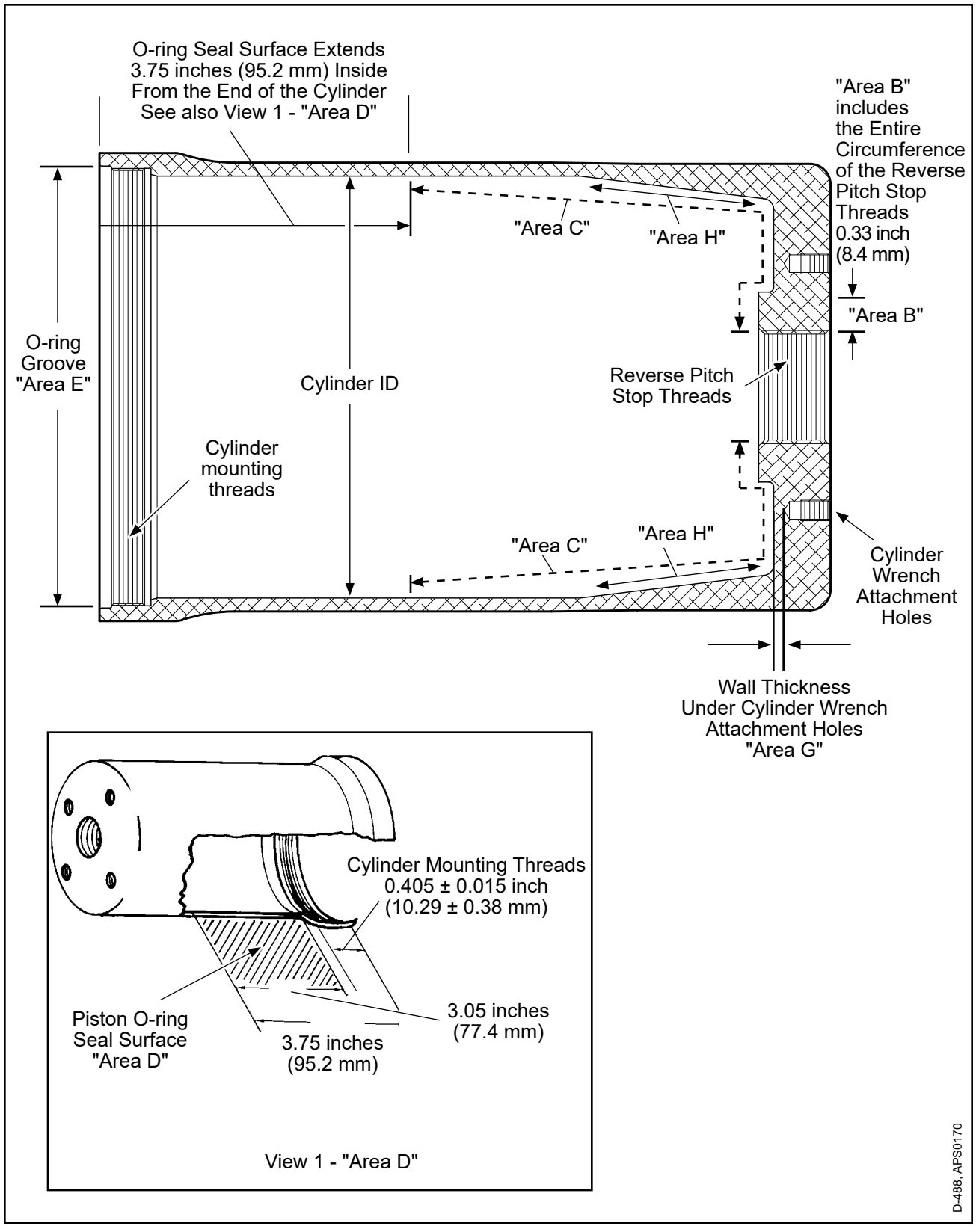
	Inspect	Serviceable Limits	Corrective Action
D.	CYLINDER p/n D-484-( ) (Item 90) Refer to Figure 5-4.		
	(1) Except "Area B", visually examine the external surfaces of the cylinder for wear, nicks, scratches, or other damage.	The maximum permitted damage (including linear corrosion pitting) is: 0.5 inch (12 mm) length, 0.05 inch (1.2 mm) width, and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12 mm) at the nearest point are not permitted. Raised material is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to blend out damage. If base aluminum is exposed, apply a chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the cylinder.
	(2) Visually examine "Area B" for damage.	The maximum permitted depth of damage in "Area B" (around the entire circumference of the reverse pitch stop threads) is 0.020 inch (0.50 mm). Sufficient flat surface must remain to support the drilled thin hex nut.	If damage is greater than the permitted serviceable limits, replace the cylinder.
	(3) Visually examine the cylinder wrench attachment holes for thread damage.	If there is damage, install a 1/4-28UNF-3B screw and make sure that it will tighten to attach the cylinder wrench for installation and removal.	If damage is greater than the permitted serviceable limits, repair the cylinder wrench attachment holes in accordance with the Standard Repairs and Instructions chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If a previously repaired hole has damage that is greater than the permitted serviceable limits, replace the cylinder.
	(4) If the cylinder wrench attachment holes are repaired with a Slimsert®, measure the depth of the cylinder wrench attachment holes (Area "G").	The minimum permitted wall thickness between the center point of the hole and the inner surface is 0.080 inch (2.03 mm).	If the wall thickness is less than the permitted serviceable limits, replace the cylinder.
	(5) Visually examine the reverse pitch stop threads for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
D.	CYLINDER p/n D-484-( ), CONTINUED (Item 90) Refer to Figure 5-4.		
(6)	Visually examine the cylinder-to-hub O-ring groove for wear (Area "E").	If the cylinder-to-hub O-ring groove shows wear, measure the ID. The maximum permitted O-ring groove ID is 5.376 inches (136.55 mm).	If the ID is greater than the permitted serviceable limit, replace the cylinder.
(7)	Visually examine the cylinder mounting threads for damage.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.
(8)	Visually examine the start lock plate mounting holes for damage (8 places) (Area "A").	For each hole, a maximum of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, repair the cylinder start lock plate mounting holes in accordance with the Standard Repairs and Instructions chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If a previously repaired hole has damage that is greater than the permitted serviceable limits, replace the cylinder.
(9)	Visually examine the start lock bracket support threaded holes (4 holes) (Area "F").	For each hole, a maximum of two threads total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.
(10)	Visually examine the internal surfaces, between the piston O-ring seal surface and the reverse pitch stop threads, for nicks, scratches, or other damage (Area "C").	The maximum permitted damage (including linear corrosion pitting) is: 0.5 inch (12 mm) length, 0.05 inch (1.2 mm) width, and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12 mm) at the nearest point are not permitted. Raised material is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to blend out damage. If base aluminum is exposed, apply a chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
D.	CYLINDER p/n D-484-( ), CONTINUED (Item 90) Refer to Figure 5-4.		
	(11) Visually examine the internal surface in Area "H" for a material deviation.	If there is material deviation, measure in accordance with the instructions in the "Inspection of the Internal Surface of the Cylinder" section of the Repair chapter of this manual. The maximum permitted depth of deviation of material is 0.030 inch (0.76 mm). A sharp corner is not permitted.	If there is a sharp corner, replace the cylinder. If the material deviation is greater than the permitted serviceable limits, replace the cylinder.
	(12) Measure the cylinder mounting thread ID within the 0.405 ± 0.015 inch (10.29 ± 0.38 mm) dimension from the end of the cylinder at six positions, 30 degrees apart.	The maximum permitted cylinder thread ID is 5.2691 inches (133.835 mm).	If the thread ID is greater than the permitted serviceable limits, replace the cylinder.
	(13) Measure the cylinder ID where the piston O-ring seals (Area "D").	The maximum permitted cylinder ID is 5.131 inches (130.33 mm).	If the cylinder ID is greater than the permitted serviceable limits, replace the cylinder.



D-488-( ) Cylinder
Figure 5-5

Component Inspection Criteria
Table 5-1

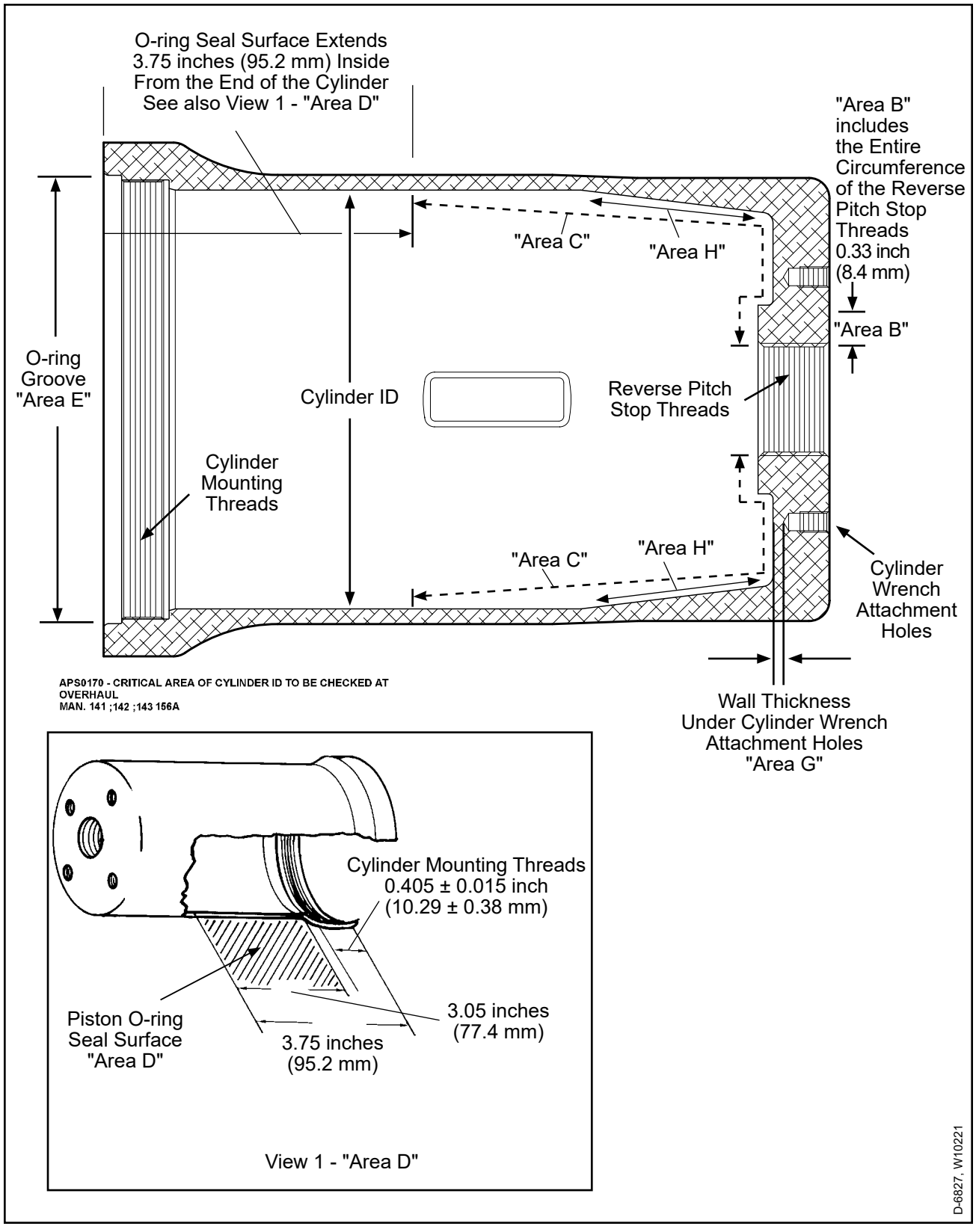
Inspect	Serviceable Limits	Corrective Action
E. CYLINDER p/n D-488-( ) (Item 90) Refer to Figure 5-5.		
(1) Except "Area B", visually examine the external surfaces of the cylinder for wear, nicks, scratches, or other damage.	The maximum permitted damage (including linear corrosion pitting) is: 0.5 inch (12 mm) length, 0.05 inch (1.2 mm) width, and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12 mm) at the nearest point are not permitted. Raised material is not permitted.	Using abrasive pad CM47 or equivalent, lightly polish to blend out damage. If base aluminum is exposed, apply a chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the cylinder.
(2) Visually examine "Area B" for damage.	The maximum permitted depth of damage in "Area B" (around the entire circumference of the reverse pitch stop threads) is 0.020 inch (0.50 mm). Sufficient flat surface must remain to support the drilled thin hex nut.	If damage is greater than the permitted serviceable limits, replace the cylinder.
(3) Visually examine the cylinder wrench attachment holes for thread damage.	If there is damage, install a 1/4-28UNF-3B screw and verify that it will tighten to secure the cylinder wrench for installation and removal.	If damage is greater than the permitted serviceable limits, repair the cylinder wrench attachment holes in accordance with the Standard Repairs and Instructions chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If a previously repaired hole has damage that is greater than the permitted serviceable limits, replace the cylinder.
(4) If a cylinder wrench attachment hole is repaired with a Slimsert®, measure the depth of the cylinder wrench attachment hole ("Area G").	The minimum permitted wall thickness between the center point of the hole and the inner surface is 0.080 inch (2.03 mm).	If the wall thickness is less than the permitted serviceable limits, replace the cylinder.
(5) Visually examine the reverse pitch stop threads for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
E. CYLINDER p/n D-488-( ), CONTINUED (Item 90) Refer to Figure 5-5.		
(6) Visually examine the cylinder-to-hub O-ring groove for wear. If there is wear in the O-ring groove, measure the ID. ("Area E")	The maximum permitted O-ring groove ID is 5.376 inches (136.55 mm).	If the ID is greater than the permitted serviceable limits, replace the cylinder.
(7) Visually examine the cylinder mounting threads for damage.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.
(8) Visually examine the internal surfaces between the piston O-ring seal surface and the reverse pitch stop threads for nicks, scratches, or other damage (Area "C").	The maximum permitted damage (including linear corrosion pitting) is: 0.5 inch (12 mm) length, 0.05 inch (1.2 mm) width and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12.7 mm) at the nearest point are not permitted. Raised material is not permitted.	Using abrasive pad CM47 or equivalent, lightly polish to blend out damage. If base aluminum is exposed, apply a chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc.Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the cylinder.
(9) Visually examine the internal surface in Area "H" for material deviation.	If there is material deviation, measure the internal surface in accordance with the instructions in the Repair chapter of this manual. The maximum permitted deviation of material is 0.030 inch (0.76 mm). A sharp corner is not permitted.	If there is a sharp corner, replace the cylinder. If the material deviation is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
E. CYLINDER p/n D-488-( ), CONTINUED (Item 90) Refer to Figure 5-5.		
(10) Measure the cylinder mounting thread ID within the 0.405 ± 0.015 inch (10.29 ± 0.38 mm) dimension from the end of the cylinder at six positions, 30 degrees apart.	The maximum permitted cylinder thread ID is 5.2691 inches (133.835 mm).	If thread ID is greater than the permitted serviceable limits, replace the cylinder.
(11) Measure the cylinder ID where the piston O-ring seals (Area "D").	The maximum permitted cylinder ID is 5.131 inches (130.33 mm).	If the cylinder ID is greater than the permitted serviceable limits, replace the cylinder.



D-1657 and D-6827 Cylinder
Figure 5-6

Component Inspection Criteria
Table 5-1

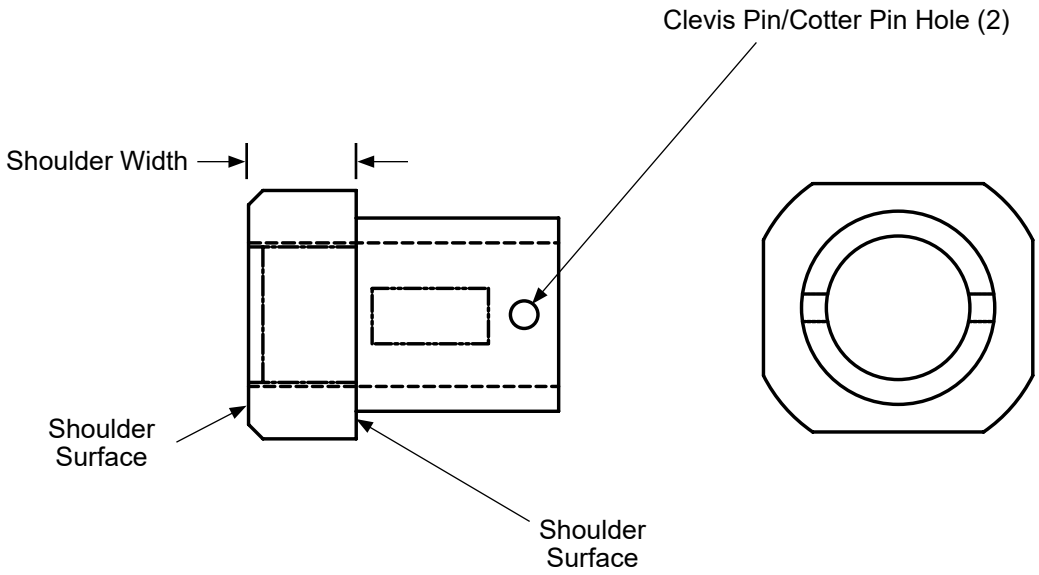
Inspect	Serviceable Limits	Corrective Action
F. CYLINDER p/n D-1657 and D-6827 (Item 90) Refer to Figure 5-6.		
(1) Except "Area B", visually examine the external surfaces of the cylinder for wear, nicks, scratches, or other damage.	The maximum permitted damage (including linear corrosion pitting is: 3.0 inches (76 mm) length, 0.05 inch (1.2 mm) width, and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12 mm) at the nearest point are not permitted. Raised material is not permitted.	If damage is less than 0.005 inch (1.2 mm) deep, using an abrasive pad CM47 or equivalent, polish to remove raised material and sharp corners. If damage is greater than 0.005 inch deep, using an abrasive pad CM47 or equivalent, lightly polish to blend out damage. A repair depth of up to 0.007 inch (0.17 mm) deep is permitted. A cumulative repair area of up to 4 square inches (2580 sq mm) is permitted. If base aluminum is exposed, apply a chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Standard Practices Manual 202A (61-01-02). If damage and/or repair is greater than the permitted serviceable limits or corrective action limits, replace the cylinder.
(2) Visually examine "Area B" for damage.	The maximum permitted depth of damage in "Area B" (around the entire circumference of the reverse pitch stop threads) is 0.020 inch (0.50 mm). Sufficient flat surface must remain to support the drilled thin hex nut.	If damage is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
F. CYLINDER p/n D-1657 and D-6827, CONTINUED (Item 90) Refer to Figure 5-6.		
(3) Visually examine the cylinder wrench attachment holes for thread damage.	If there is damage, install a 1/4-28UNF-3B screw and make sure that it will tighten to attach the cylinder wrench for installation and removal.	If damage is greater than the permitted serviceable limits, repair the cylinder wrench attachment holes in accordance with the Standard Repairs and Instructions chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If a previously repaired hole has damage that is greater than the permitted serviceable limits, replace the cylinder.
(4) If the cylinder wrench attachment holes are repaired with a Slimsert®, measure the depth of the cylinder wrench attachment holes (Area G).	The minimum permitted wall thickness between the center point of the hole and the inner surface is 0.080 inch (2.03 mm).	If the wall thickness is less than the permitted serviceable limits, replace the cylinder.
(5) Visually examine the reverse pitch stop threads for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.
(6) Visually examine the cylinder-to-hub O-ring groove for wear (Area "E").	If the cylinder-to-hub O-ring groove shows wear, measure the ID. The maximum permitted O-ring groove ID is: for the D-1657 Cylinder - 5.376 inches (136.55 mm). for the D-6827 Cylinder - 5.494 inches (139.54 mm).	If the O-ring groove ID is greater than the permitted serviceable limits, replace the cylinder.
(7) Visually examine the reverse pitch stop threads for damage.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
F.	CYLINDER p/n D-1657 and D-6827, CONTINUED (Item 90) Refer to Figure 5-6.		
(8)	Visually examine the internal surfaces, between the piston O-ring seal surface and the reverse pitch stop threads, for nicks, scratches, or other damage. (Area "C")	The maximum permitted damage (including linear corrosion pitting) is: 0.5 inch (12 mm) length, 0.05 inch (1.2 mm) width, and 0.005 inch (0.12 mm) depth. Two damage marks closer than 0.5 inch (12.7 mm) at the nearest point are not permitted. Raised material is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to blend out damage. If base aluminum is exposed, apply a chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the cylinder.
(9)	Visually examine the internal surface in Area "H" for a rough surface that is below the surrounding machined surface.F.	If there is a rough surface, inspect in accordance with the instructions in the Repair chapter of this manual. The maximum permitted depth below the surrounding machined surface is 0.030 inch (0.76 mm). A sharp corner that is in or adjacent to the rough surface is not permitted.	If there is a sharp corner, replace the cylinder. If the rough surface depth is greater than the permitted serviceable limits, replace the cylinder.
(10)	For the D-1657 cylinder only: Measure the cylinder mounting thread ID within the 0.405 ± 0.015 inch (10.29 ± 0.38 mm) from the end of the cylinder at six positions, 30 degrees apart.	The maximum permitted cylinder thread ID is 5.2691 inches (133.835 mm).	If the ID is greater than the permitted serviceable limits, replace the cylinder.
(11)	Measure the cylinder ID where the piston O-ring seals (Area "D").	The maximum permitted cylinder ID is 5.131 inches (130.32 mm).	If the ID is greater than the permitted serviceable limits, replace the cylinder.



Start Lock Housing
Figure 5-7

Component Inspection Criteria
Table 5-1

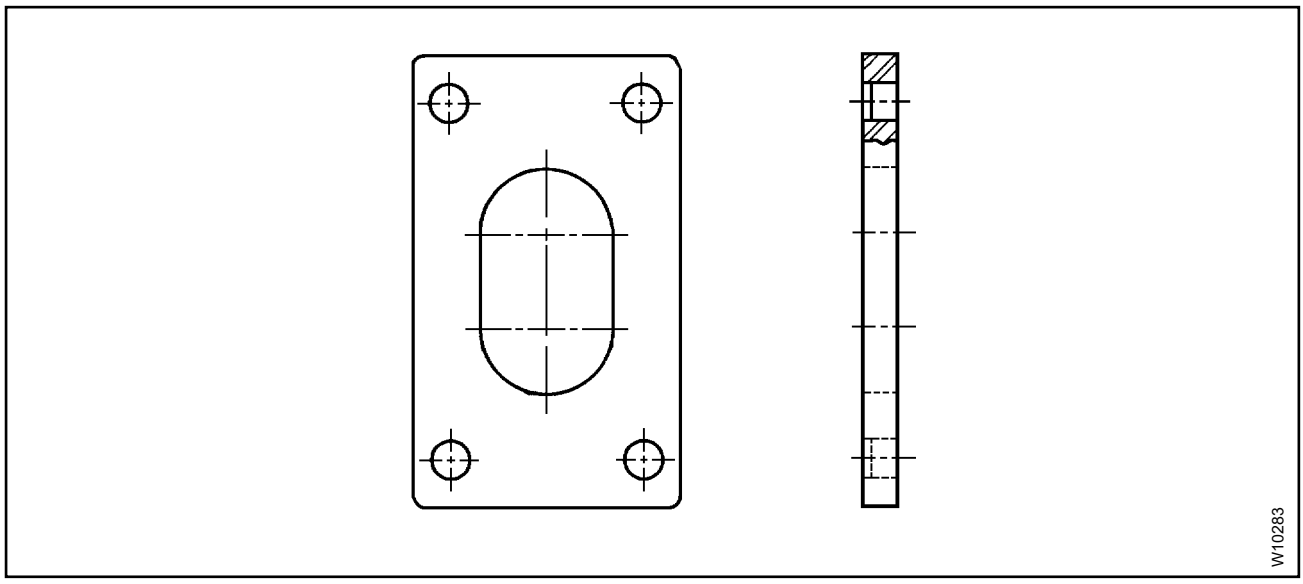
Inspect	Serviceable Limits	Corrective Action
G. START LOCK HOUSING (Item 140) Refer to Figure 5-7.		
(1) Visually examine the outer surfaces of the start lock housing for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the start lock housing. If the pitting is greater than the permitted serviceable limits, replace the start lock housing.
(2) Visually examine the outer surfaces of the start lock housing for wear or damage.	The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm). Raised material is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to blend damage with the surrounding areas. If damage is greater than the permitted serviceable limits, replace the start lock housing.
(3) Visually examine the shoulder surfaces of the start lock housing for wear, damage, or pitting.	If there is wear, damage, or pitting, measure the shoulder width. The minimum permitted width is 0.373 inch (9.47 mm). The maximum permitted area of wear, damage, or pitting is 25% of either shoulder surface area.	If the shoulder width is less than the permitted serviceable limits, replace the start lock housing. If wear, damage, or pitting is greater than the permitted serviceable limits, replace the start lock housing.
(4) Visually examine the bore of the start lock housing for corrosion product, pitting, or damage.	Corrosion product, pitting, or damage is not permitted.	If there is corrosion product, pitting, or damage, replace the start lock housing.
(5) Visually examine the bore ID of the start lock housing for wear.	If there is wear, measure the bore ID. The maximum permitted bore ID is 0.504 inch (12.80 mm).	If the ID is greater than the permitted serviceable limits, replace the start lock housing.

Component Inspection Criteria
Table 5-1

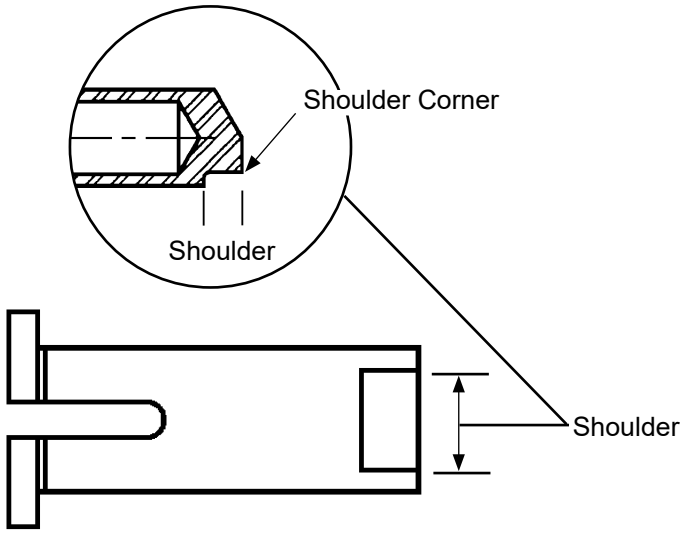
Inspect	Serviceable Limits	Corrective Action
G. START LOCK HOUSING, CONTINUED (Item 140) Refer to Figure 5-7.		
(6) Visually examine the clevis pin/cotter pin holes for corrosion product, pitting, or damage.	Corrosion product, pitting, or damage is not permitted.	If there is corrosion product, pitting, or damage, replace the start lock housing.
(7) Visually examine the clevis pin/cotter pin holes for wear.	Slight wear in the form of hole elongation is permitted. The maximum permitted width of a clevis pin hole is 0.10 inch (2.5 mm).	If the width is greater than the permitted serviceable limits, replace the start lock housing.
(8) Visually examine the start lock housing for cadmium plate coverage.	A few random scratches are permitted; otherwise, cadmium plate must cover the start lock housing.	If coverage is less than the permitted serviceable limits, replate the start lock housing in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
H. START LOCK HOUSING COVER (Item 150) Refer to Figure 5-8.		
(1) Visually examine the start lock housing cover for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting must not affect the secure retention of the start lock housing (140).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the start lock housing.
(2) Visually examine the start lock housing cover for wear or damage.	Maximum permitted depth of wear or damage is 0.005 inch (0.12 mm).Wear or damage must not affect the secure retention of the start lock housing (140).	If wear or damage is greater than the permitted serviceable limits, replace the start lock housing cover.
(3) Visually examine the start lock housing cover for cadmium plate coverage.	A few random scratches are permitted; otherwise, cadmium plate must cover the start lock housing cover.	If coverage is less than the permitted serviceable limits, replate the start lock housing cover in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Start Lock Housing Cover
Figure 5-8

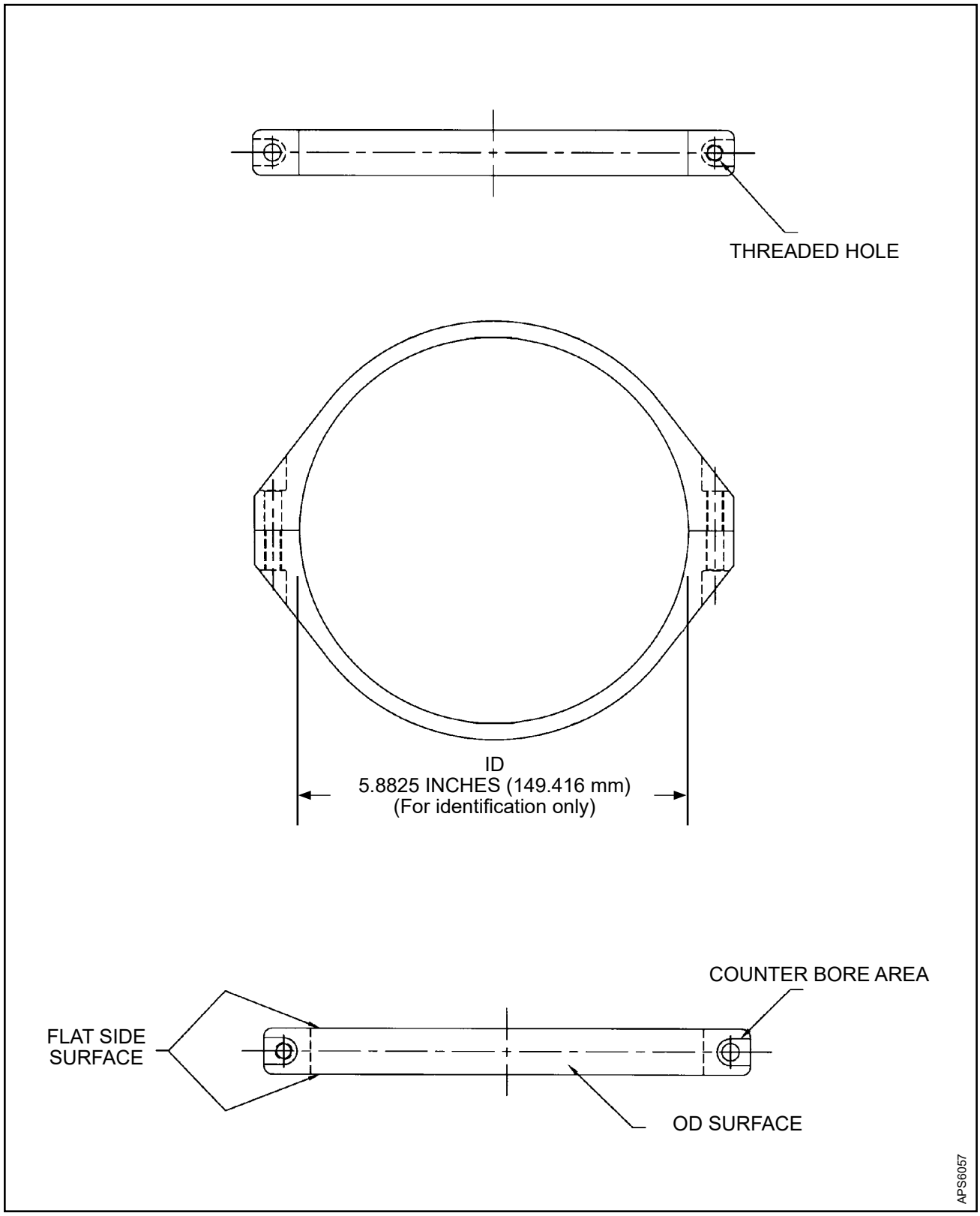


W10222, W10330

Start Lock Pin
Figure 5-9

Component Inspection Criteria
Table 5-1

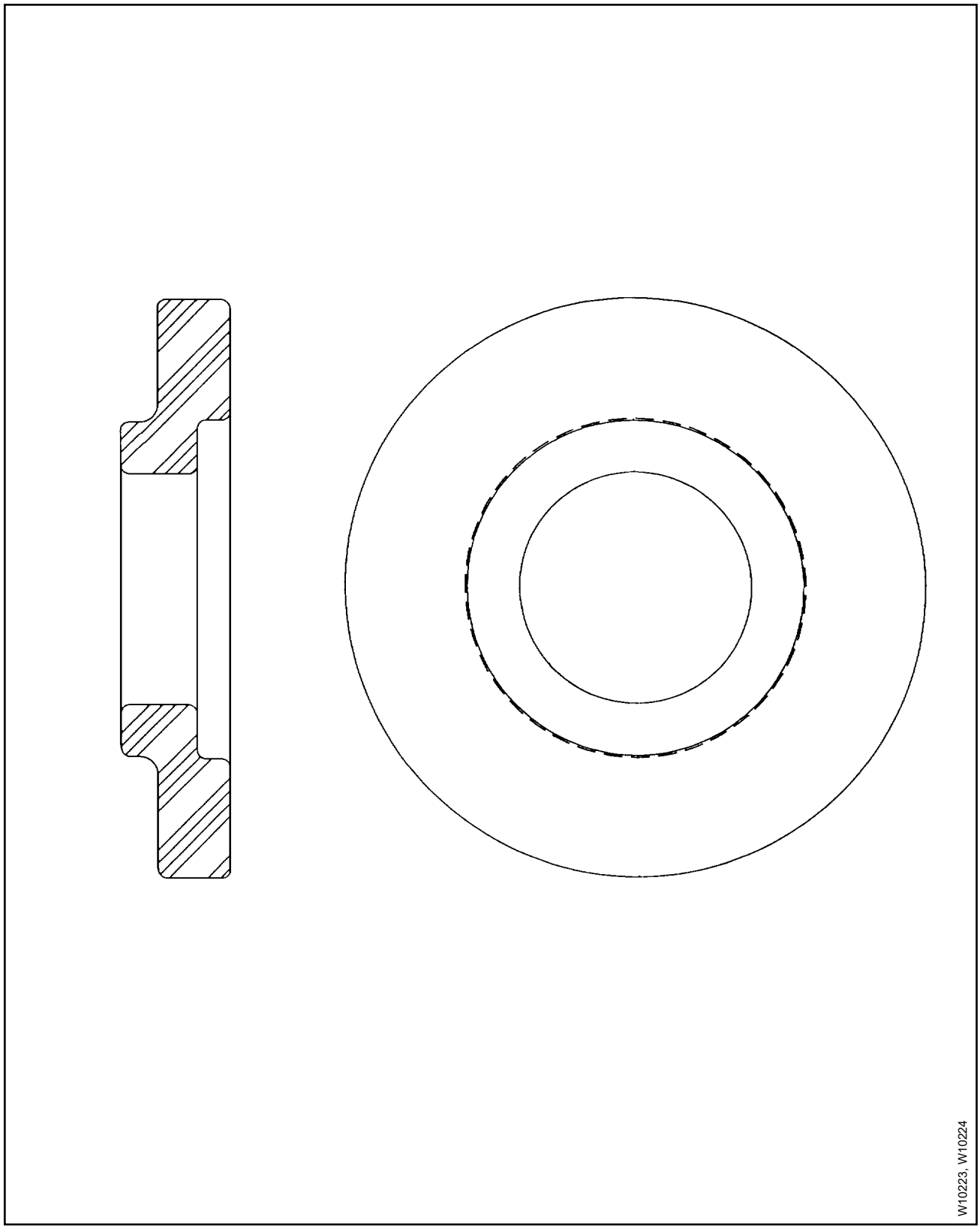
	Inspect	Serviceable Limits	Corrective Action
I.	START LOCK PIN (Item 160) Refer to Figure 5-9.		
(1)	Visually examine the start lock pin for corrosion product or damage.	Corrosion product or damage is not permitted.	Light corrosion product may be removed with glass bead cleaning; otherwise, replace the start lock pin.
(2)	Visually examine the start lock pin shaft diameter for wear.	If there is wear, measure the start lock pin. The minimum permitted shaft OD is 0.494 inch (12.55 mm).	If the OD is less than the permitted serviceable limits, replace the start lock pin.
(3)	Visually examine the shoulder corner for wear.	If there is wear, measure the shoulder corner. The maximum permitted shoulder corner radius is 0.032 inch (0.81 mm).	If the shoulder corner radius is greater than serviceable limits, replace the start lock pin.



Inspection Areas and Identification of the B-6472 Cylinder Clamp
Figure 5-10

Component Inspection Criteria
Table 5-1

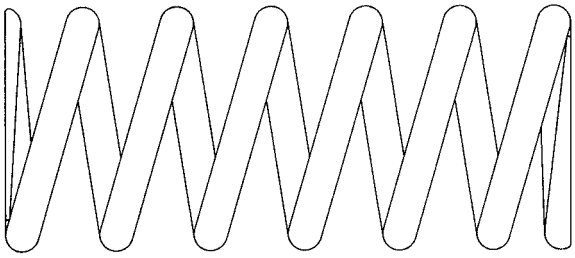
		Inspect	Serviceable Limits	Corrective Action
J.	CYLINDER CLAMP (Item 230) Refer to Figure 5-10.			
	(1)	Visually examine the cylinder clamp ID and OD for scratches, nicks, or gouges.	The maximum permitted depth of damage is 0.015 inch (0.38 mm). More than 3 linear indications per 1 sq. inch (645 sq. mm) are not permitted. Indications may be no closer than 0.250 inch (6.35 mm) to each other and must not form a continuous linear pattern within that area.	If the depth of damage is greater than the permitted serviceable limits, replace the cylinder clamp.
	(2)	Visually examine the cylinder clamp ID and OD for corrosion product or pitting.	More than 10 non-linear indications of corrosion product and pitting of greater than 0.032 inch (0.81 mm) diameter within a 1 sq. inch (645 sq. mm) area are not permitted.	If the corrosion product and pitting is not within the permitted serviceable limits, replace the cylinder clamp.
	(3)	Visually examine the counterbore area for scratches, nicks, or gouges.	The maximum permitted depth of damage is 0.015 inch (0.38 mm).	If the depth of damage is greater than the permitted serviceable limits, replace the cylinder clamp.
	(4)	Visually examine the counterbore area for corrosion product or pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the cylinder clamp.
	(5)	Visually examine the threaded area.	A total of one damaged thread in each threaded hole is permitted. Damaged thread must not interfere with installed screw threads. Corrosion product or pitting is not permitted.	If the damage is greater than the permitted serviceable limits, replace the cylinder clamp. If there is corrosion product or pitting, replace the cylinder clamp.
	(6)	Inspect the threaded area with a 1/4-28 UNF-3B "Go-No/Go" thread gauge.	Only the "Go" portion of a 1/4-28 UNF-3B thread gauge is permitted to enter the threaded hole.	If the "Go-No/Go" thread gauge inspection does not meet the permitted serviceable limits, replace the cylinder clamp.



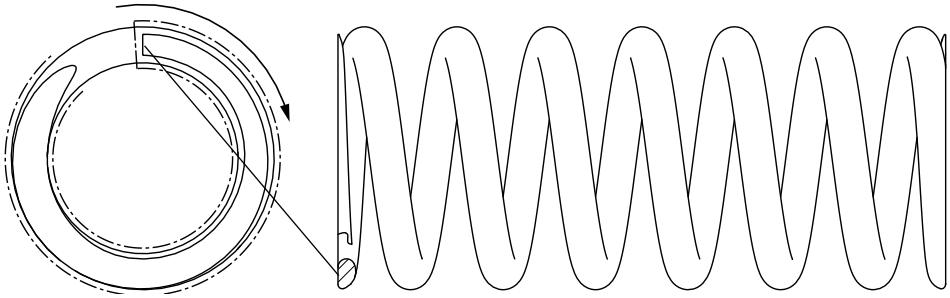
Forward Spring Retainer
Figure 5-11

Component Inspection Criteria
Table 5-1

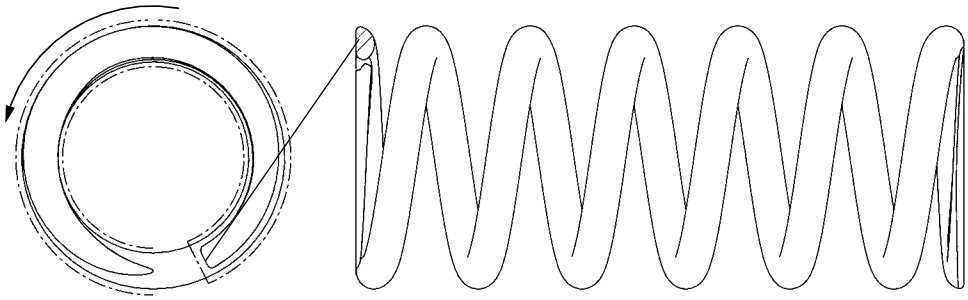
	Inspect	Serviceable Limits	Corrective Action
K.	FORWARD SPRING RETAINER (Item 250) Refer to Figure 5-11.		
	(1) Visually examine the forward spring retainer for wear or damage.	The maximum permitted depth of wear or damage is 0.020 inch (0.50 mm).	If the depth of wear or damage is greater than the permitted serviceable limits, replace the forward spring retainer.



Feathering Compression Spring



106926 Feathering Compression Spring
Right Hand Winding



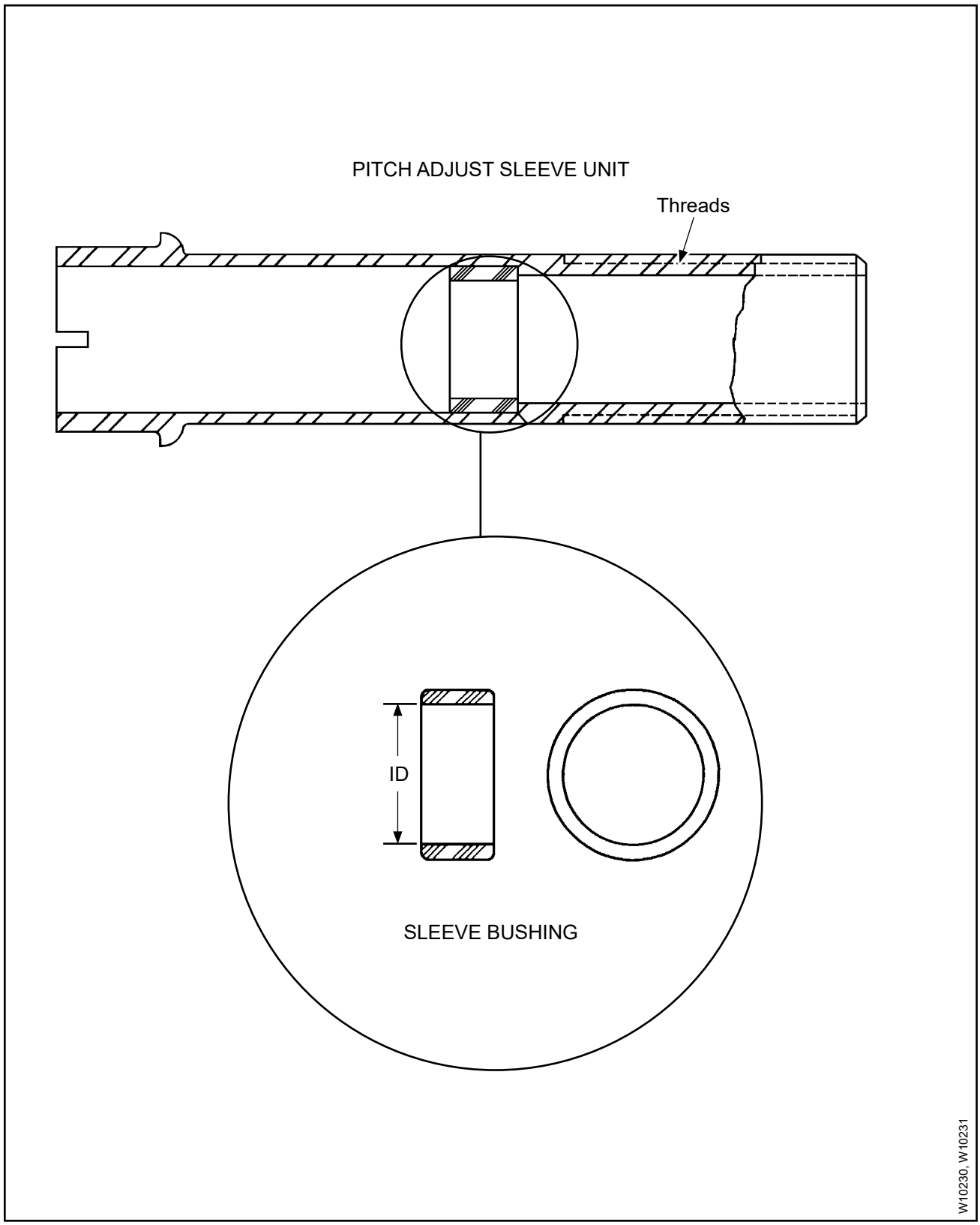
C-6760 Feathering Compression Spring
Left Hand Winding

W10226, TPI-LW-143A-00702, TPI-LW-143A-00703

Feathering Compression Springs
Figure 5-12

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
L.	FEATHERING COMPRESSION SPRING (Item 260) Refer to Figure 5-12.		
	NOTE: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.		
(1)	Visually examine the feathering compression spring for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the feathering compression spring. If the pitting is greater than the permitted serviceable limits, replace the feathering compression spring.
(2)	Visually examine the feathering compression spring for wear, nicks, or other damage.	The maximum permitted depth of wear, nicks, or other damage is 0.005 inch (0.12 mm).	If wear, nicks, or damage is greater than the permitted serviceable limits, replace the feathering compression spring.
(3)	Magnetic particle inspect the feathering compression spring in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Do not strip the original zinc plating or zinc chromate primer.	A relevant indication is not permitted.	If there is a relevant indication, replace the feathering compression spring.
(4)	After magnetic particle inspection, visually examine the feathering compression spring for zinc plate or zinc chromate primer coverage.	A few random scratches are permitted, otherwise, complete coverage of zinc plating or zinc chromate primer on all surfaces of the feathering compression spring is required.	Apply a layer of zinc chromate primer CM67, or equivalent, to the feathering compression spring in accordance with the Repair chapter of this manual. Do not apply zinc chromate primer before magnetic particle inspection.



Pitch Adjust Sleeve Unit and Sleeve Bushing
Figure 5-13

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
M.	PITCH ADJUST SLEEVE UNIT (Item 280) Refer to Figure 5-13.		
	NOTE: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.		
	(1) Visually examine the reverse adjust sleeve threads for damage.	A total of one thread accumulated damage is permitted. Thread damage must not interfere with the movement of the mating jam nut or movement of the reverse adjust sleeve in the cylinder.	If damage is greater than the permitted serviceable limits, replace the pitch adjust sleeve unit.
	(2) Visually examine the pitch adjust sleeve unit for cadmium plate coverage.	A few scratches, corners with plating missing, and light wear of the plating from the threads because of nut installation is permitted; otherwise, complete coverage is required.	If coverage it less than the permitted serviceable limits, remove the sleeve bushing (300) and replate the reverse adjust sleeve in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02). For sleeve bushing removal procedures, refer to the Repair section of this manual.
	(3) Magnetic particle inspect the pitch adjust sleeve unit in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the sleeve bushing.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch adjust sleeve unit.

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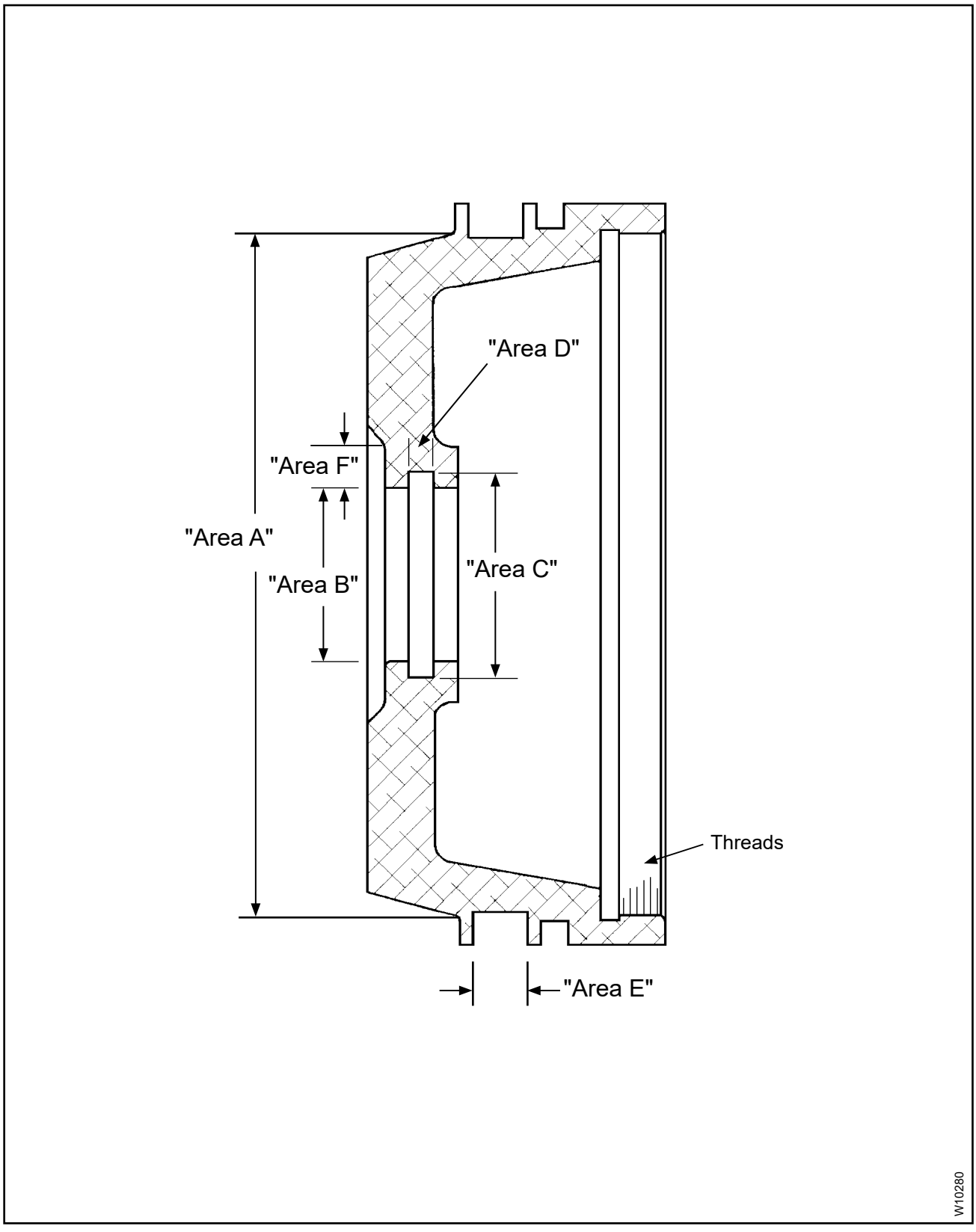
Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
N.	SLEEVE BUSHING (Item 300) Refer to Figure 5-13.		
	(1) Visually examine the sleeve bushing ID for damage.	The maximum permitted depth of damage is 0.010 inch (0.25 mm). The maximum permitted damage to the ID surface is 10%.	If damage is greater than the permitted serviceable limits, remove and replace the pitch sleeve bushing in accordance with the Repair section of this manual. NOTE: If the pitch adjust sleeve (290) must be replated, install the sleeve bushing after plating.
	(2) Measure the ID of the sleeve bushing.	The maximum permitted ID is 1.006 inch (25.55 mm).	If the ID is greater than the permitted serviceable limits, remove and replace the sleeve bushing in accordance with the Repair section of this manual. NOTE: If the pitch adjust sleeve (290) must be replated, install the sleeve bushing after plating.



Piston
Figure 5-14

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
O. PISTON (Item 330) Refer to Figure 5-14.		
(1) Excluding the O-ring grooves, visually examine the anodized surfaces of the piston for wear, nicks, scratches, or other damage.	The maximum permitted depth of wear, nicks, scratches, or damage is 0.005 inch (0.12 mm).	If wear, nicks, scratches, or damage is greater than the permitted serviceable limits, replace the piston.
(2) Visually examine the piston threads for damage. NOTE: The thread inspection is only applicable to pistons that use a start lock piston ring or piston bushing. For pistons that do not use these threads, it is not necessary to inspect the threads.	A maximum of 1/2 of one thread total accumulated damage is permitted. Damage must not interfere with the ability to thread a start lock piston ring or piston bushing onto the piston.	If damage is greater than the permitted serviceable limits, replace the piston.
(3) Visually examine the piston bore recessed area around the entire circumference of the center hole for scoring or gouging caused by pitch change rod wrenching flats (Area "F").	The maximum permitted depth of damage is 0.030 inch (0.76 mm). Sufficient flat surface must remain in Area "F" to support the piston correctly on the pitch change rod shoulder.	If damage is greater than the permitted serviceable limits, replace the piston.
(4) Visually examine the number of spring pin holes in the piston.	A maximum of five empty holes and a sixth with a spring pin installed is permitted.	If there are more holes than the permitted serviceable limits, replace the piston.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
O. PISTON, CONTINUED (Item 330) Refer to Figure 5-14.		
(5) Measure the piston O-ring groove OD (Area "A").	The minimum permitted O-ring groove OD is 4.644 inches (117.96 mm).	If the OD is less than the permitted serviceable limits, replace the piston.
(6) Measure the piston bore ID (Area "B").	The maximum permitted piston bore ID is 1.191 inch (30.25 mm).	If the ID is greater than the permitted serviceable limits, replace the piston.
(7) Measure the piston O-ring groove ID (Area "C").	The maximum permitted piston O-ring groove ID is 1.416 inch (35.96 mm).	If the piston O-ring groove ID is greater than the permitted serviceable limits, replace the piston.
(8) Measure the piston O-ring groove width (Area "D").	The maximum permitted piston O-ring groove width in Area "D" is 0.180 inch (4.57 mm). The minimum permitted piston O-ring groove width in Area "D" is 0.163 inch (4.15 mm).	If the width of the piston O-ring groove is greater than the permitted serviceable limits, replace the piston.
(9) Measure the piston O-ring groove width (Area "E").	The maximum permitted piston O-ring groove width in Area "E" is 0.385 inch (9.77 mm).	If the piston O-ring groove width is greater than the permitted serviceable limits, replace the piston.
(10) Penetrant inspect the piston in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). CAUTION: DO NOT REMOVE THE ANODIZE COATING BEFORE PENETRANT INSPECTION.	A relevant indication is not permitted.	If there is a relevant indication, replace the piston.

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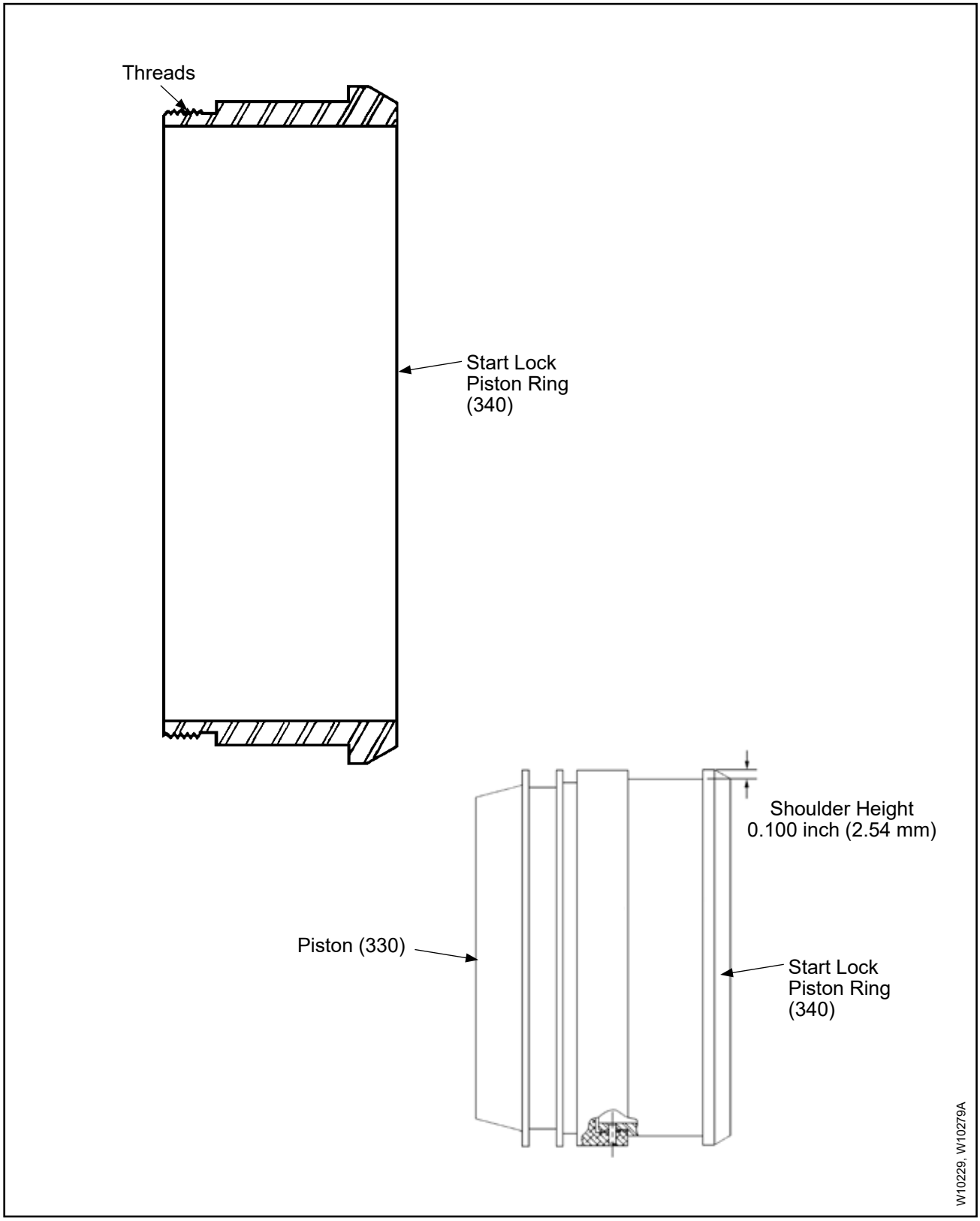
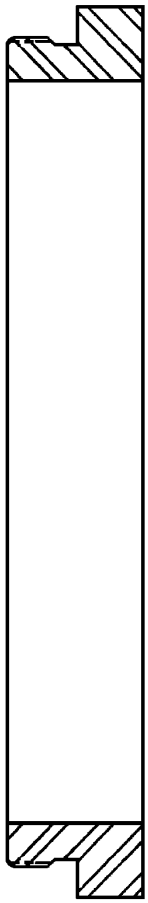


Start Lock Piston Ring Inspection Criteria
Figure 5-15

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
P.	START LOCK PISTON RING (Item 340) Refer to Figure 5-15.		
(1)	Visually examine the threads of the start lock piston ring for corrosion product or damage.	Corrosion product is not permitted. A maximum of 1/2 of one thread total accumulated damage is permitted. Damage must not affect the ability to thread onto the piston. Spring pin holes are considered thread damage.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the damage is greater than the permitted serviceable limits, replace the start lock piston ring.
(2)	Visually examine the surface of the start lock piston ring for nicks, scratches, or other damage.	The maximum permitted depth of nicks, scratches, or damage is 0.010 inch (0.25 mm).	If the depth of nicks, scratches, or damage is greater than the permitted serviceable limits, replace the start lock piston ring.
(3)	Measure the shoulder height of the start lock piston ring.	The minimum permitted shoulder height is 0.100 inch (2.54 mm) in all locations around the circumference.	If the height is less than the permitted serviceable limits, replace the start lock piston ring.
(4)	Visually examine the start lock piston ring for the number of spring pin holes.	A maximum of five empty holes and a sixth with a spring pin installed is permitted.	If there are more holes than the permitted serviceable limits, replace the start lock piston ring.
(5)	Visually examine the cadmium plating coverage on the surface of the start lock piston ring.	Cadmium plating must cover the ring. A few random scratches and wear where the start lock pins contact the start lock piston ring are permitted; otherwise, the ring must have complete cadmium plating coverage.	If cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the start lock piston ring in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(6)	Magnetic particle inspect the start lock piston ring in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the start lock piston ring.



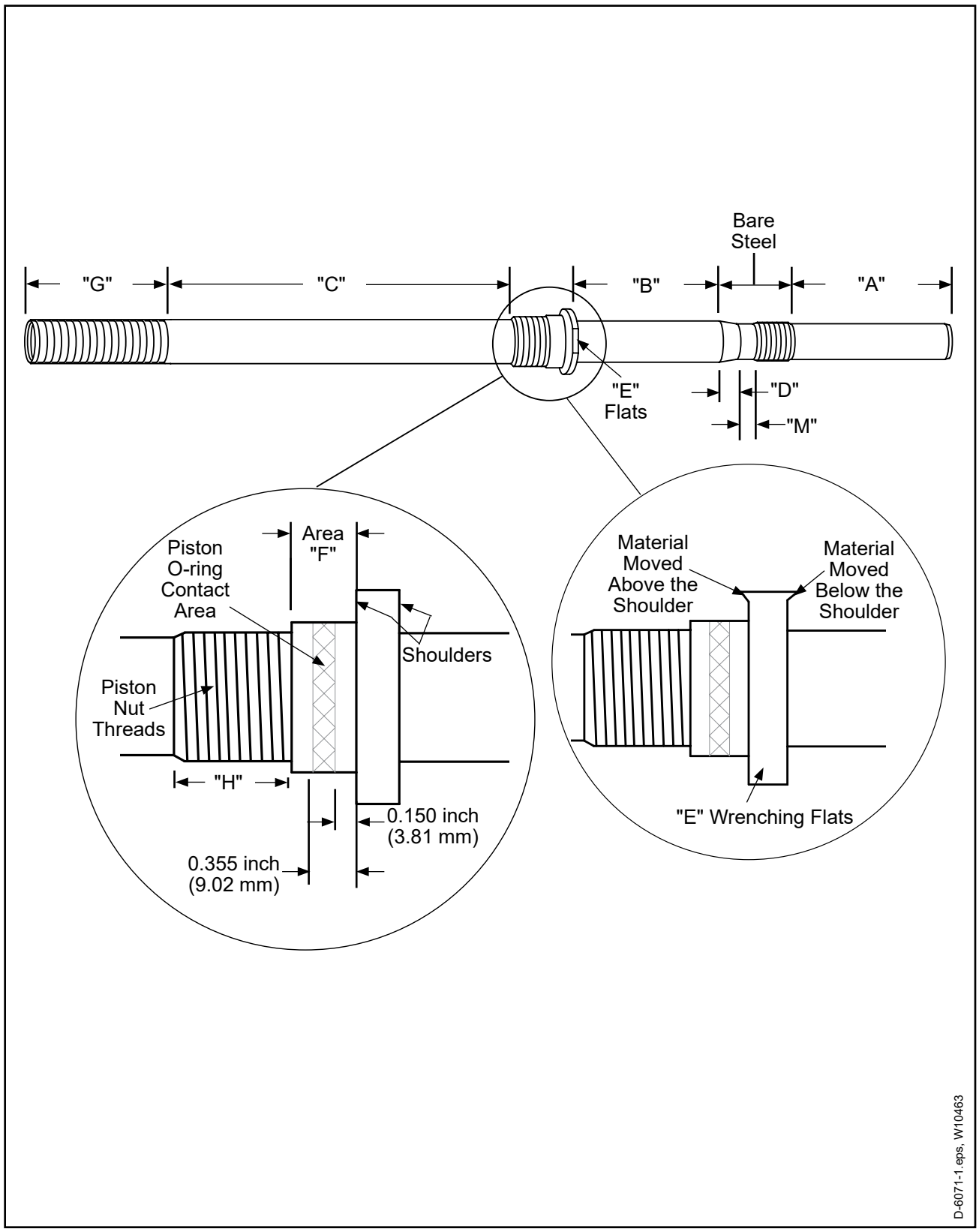
Piston Bushing

W10235

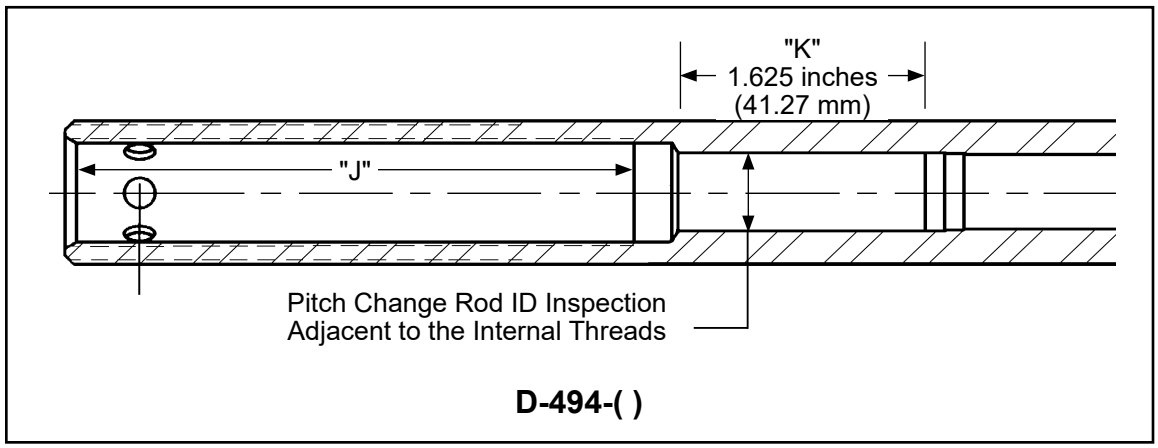
Piston Bushing Inspection Criteria
Figure 5-16

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
Q. PISTON BUSHING (Item 350) Refer to Figure 5-16.		
(1) Visually examine the threads of the piston bushing for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted. Damage must not affect the ability to thread onto the piston. Spring pin holes are considered thread damage.	If damage is greater than the permitted serviceable limits, replace the piston bushing.
(2) Visually examine the number of spring pin holes in the piston bushing.	A maximum of five empty holes and a sixth with a spring pin installed is permitted.	If there are more holes than the permitted serviceable limits, replace the piston bushing.
(3) Visually examine the surface of the piston bushing for nicks, gouges, scratches, or other damage.	The maximum permitted depth of damage is 0.030 inch (0.76 mm). Damage must not interfere with uniform engagement of both tappets.	If damage is greater than the permitted serviceable limits, replace the piston bushing.
(4) Visually examine the surface of the piston bushing for impressions caused by the tappets.	The maximum permitted depth of a tappet impression is 0.003 inch (0.07 mm).	If the depth is greater than the permitted serviceable limits, replace the piston bushing.



Pitch Change Rod
Figure 5-17



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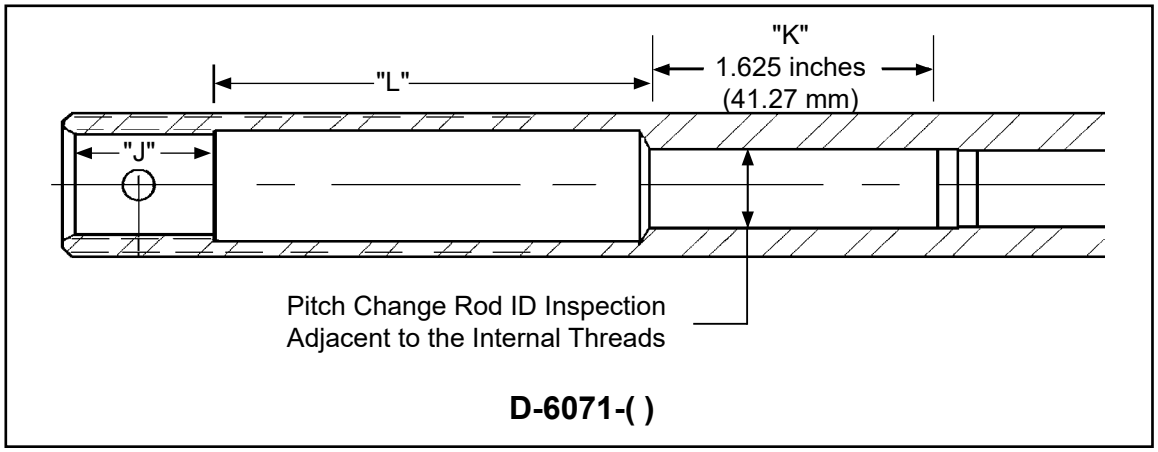

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D-494-1 and D-6071-1 Pitch Change Rod
Figure 5-18

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE ROD (Item 430) Refer to Figure 5-17 and Figure 5-18.		
	(1) Visually examine the pitch change rod for corrosion product and pitting.	Except where specifically permitted in this section, corrosion product is not permitted. Pitting is not permitted,	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the pitch change rod. If the pitting is greater than the permitted serviceable limits, replace the pitch change rod.
	(2) Visually examine the pitch change rod for chrome plating coverage (Areas "A", "B", and "C")	Minor wear that is within the dimensional limits in this table and random, light scratches that are not greater than the chrome plate depth and do not affect the seal with the O-ring are permitted; otherwise, complete chrome plating coverage is required.	Using an abrasive pad CM47 or equivalent, lightly hand polish to remove high spots as necessary. If the wear or damage is greater than the permitted serviceable limits, either replace the pitch change rod or return to Hartzell Propeller Inc.
	(3) Visually examine the pitch change rod threads for cadmium plating coverage (Areas "G" and "H") (Area "J" if applicable)	Minor wear on corners and random light scratches are permitted; otherwise, complete cadmium plating coverage is required.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the threaded areas of the pitch change rod in accordance with the Cadmium Replating chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	(4) Visually examine the pitch change rod for straightness.	The pitch change rod must be straight.	If the pitch change rod is not straight, replace the pitch change rod.
	(5) Visually examine the pitch change rod external threads for damage.	A maximum of 1/2 of one thread total accumulated damage in each threaded area is permitted. A damaged thread must not interfere with mating part threads.	If damage is greater than the permitted serviceable limits, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

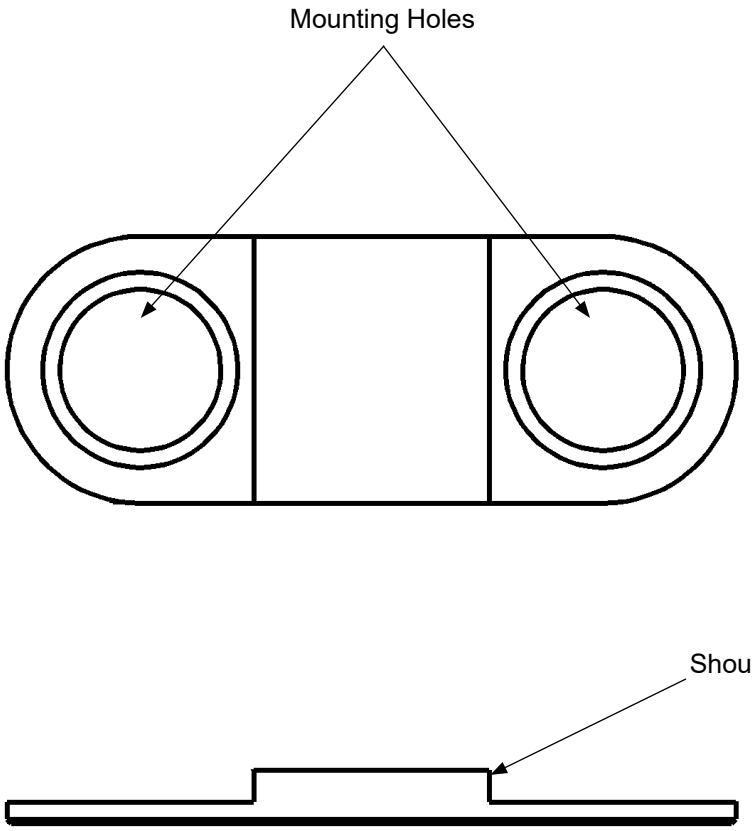
	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE ROD, CONTINUED (Item 430) Refer to Figure 5-17.		
(6)	Visually examine the pitch change rod fork taper for pitting, wear, or damage (Area "D").	Pitting, wear, or damage is not permitted at the smallest diameter of the taper or within 0.093 inch (2.36 mm) of the smallest diameter. The remaining taper surface may have a maximum damage depth of 0.004 inch (0.10 mm) over 10% of the surface area. Raised material is not permitted.	If damage causes raised material above the existing surface, remove only the raised material. If pitting, wear, or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(7)	Visually examine the pitch change rod OD for pitting, wear, or damage (Area "M").	Pitting, wear, or damage is not permitted. The minimum permitted OD including repair is 0.794 inch (20.16 mm).	Pitting or damage may be repaired by polishing with emery cloth to a maximum permitted depth of 0.002 inch (0.05 mm). If pitting, wear, or damage is greater than the permitted serviceable limits or corrective action limits replace the pitch change rod.
(8)	Visually examine the pitch change rod wrenching flats for moved material (Area "E").	Moved material caused by wrench engagement must not be above or below the pitch change rod shoulder surfaces. Sufficient flat surfaces must remain to support applied open-end wrench torque	Remove the moved material flush with the pitch change rod shoulder thickness. If damage is greater than the permitted serviceable limits, replace the pitch change rod.
(9)	Visually examine the pitch change rod-to-piston contact area of Area "F" between the shoulder and threads for damage or pitting.	Pitting or damage is not permitted. in the area between 0.150 inch (3.81 mm) and 0.355 inch (9.01 mm) from the shoulder.	If there is pitting or damage, replace the pitch change rod.
(10)	Visually examine the pitch change rod-to-piston contact area between the shoulder and threads outside of the piston O-ring contact area of Area "F" for damage or pitting.	The maximum permitted depth of pitting or damage is 0.007 inch (0.178 mm). Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Using an abrasive pad CM47, polish to remove corrosion product, pitting or damage. If pitting or damage is greater than the permitted serviceable limits, replace the pitch change rod. If the corrosion product cannot be removed, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE ROD, CONTINUED (Item 430) Refer to Figure 5-17 and Figure 5-18.		
(11)	Using a borescope or fiber optic flashlight, visually examine the oil supply bore for unwanted material.	Unwanted material is not permitted.	Remove all unwanted material. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(12)	If applicable, visually examine the pitch change rod internal threads for damage.	A maximum of one thread total accumulated damage is permitted. A damaged thread must not interfere with mating part threads.	If damage is greater than the permitted serviceable limits, replace the pitch change rod.
(13)	For D-6071-1 and D-494-1 rods only, visually examine the pitch change rod ID adjacent to the internal threads, in the 1.625 inch (41.27 mm), area for wear or damage. (Area "K")	If there is wear or damage, measure the ID in Area "K". The maximum permitted ID is 0.550 inch (13.97 mm). Damage is not permitted.	If wear or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(14)	For D-6071-1 rods only, visually examine the pitch change rod ID adjacent to the internal threads. (Area "L")	If there is wear or damage, measure the ID in Area "L". The maximum permitted ID is 0.788 inch (20.01 mm). Damage is not permitted.	If wear or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(15)	Measure the pitch change rod OD in Areas "A", "B", and "C".	The minimum permitted OD in Area "A" is 0.807 inch (20.50 mm. The minimum permitted OD in Area "B" is 0.932 inch (23.67 mm). The minimum permitted OD in Area "C" is 0.994 inch (25.25 mm).	If the OD in Area "A", "B", or "C" is less than the permitted serviceable limits, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

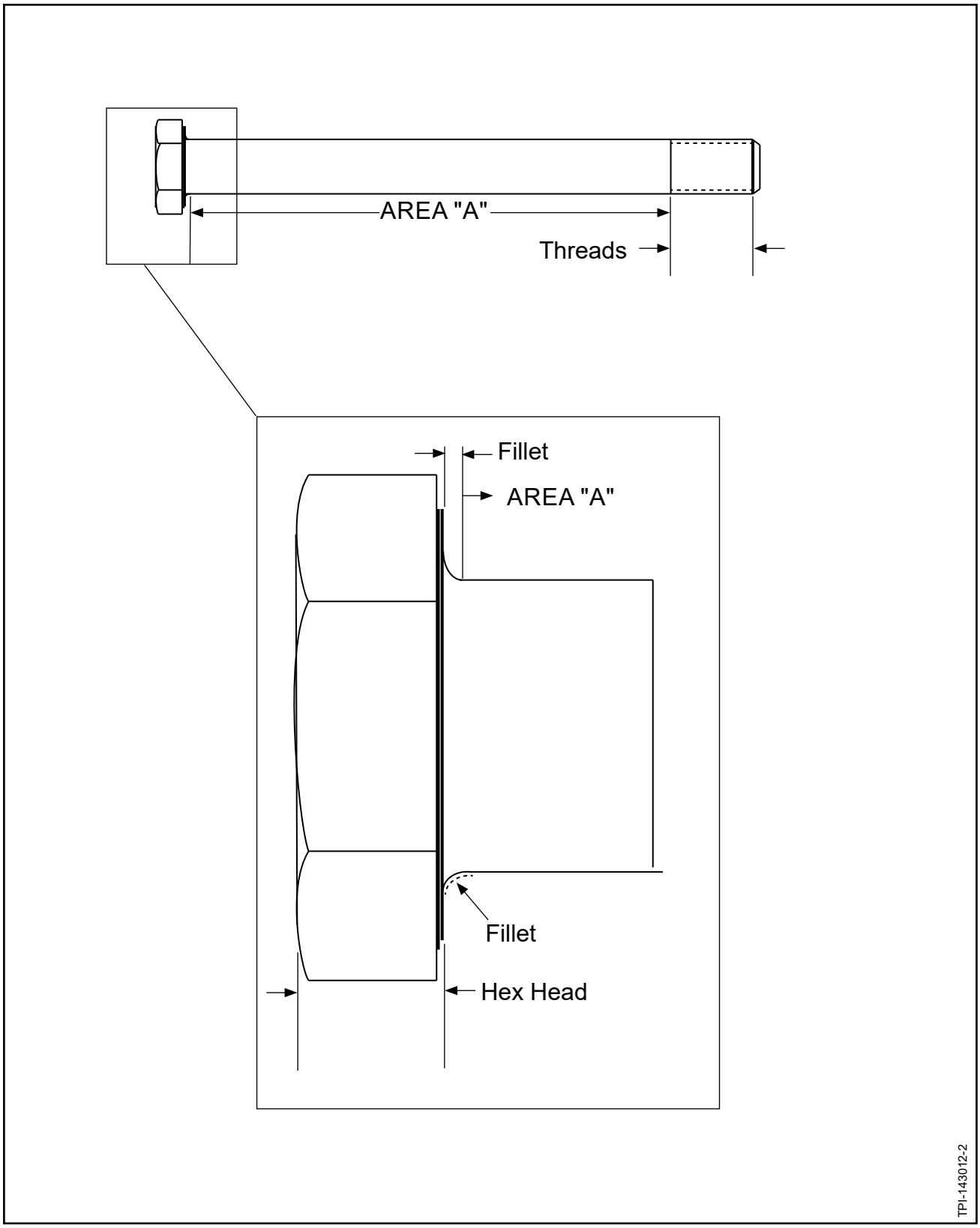
Inspect	Serviceable Limits	Corrective Action
R. PITCH CHANGE ROD, CONTINUED (Item 430) Refer to Figure 5-17.		
(16) Magnetic particle inspect the pitch change rod in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) CAUTION: DO NOT STRIP THE CHROME PLATING.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change rod.



Hub Mounting Plate
Figure 5-19

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
S. HUB MOUNTING PLATE (Item 446) Refer to Figure 5-19.		
(1) Visually examine the hub mounting plate for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the hub mounting plate is damaged, measure the depth of damage. The maximum permitted depth of pitting, nicks, scratches, or other damage is 0.005 inch (0.13 mm). Dimpling because of rotation of the head of the mounting bolt (447) is permitted. Significant dimpling that permits unrestrained rotation of the bolt head is not permitted. High spots or edges above the surrounding machined surfaces are not permitted. Total amount of damage permitted is 10% of the total surface area. The maximum permitted diameter of an Individual pit is 0.032 inch (0.81 mm). The maximum permitted number of non-linear pits is 10 within a 1 square inch (645 square mm) area. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Using an abrasive pad CM47 or equivalent, polish to remove high spots. If the corrosion product cannot be removed, replace the hub mounting plate. If the pitting or damage is greater than the permitted serviceable limits, replace the hub mounting plate.
(2) Measure the ID of each mounting bolt through hole.	The maximum permitted ID is 0.572 inch (14.52 mm).	If the ID is greater than the permitted serviceable limits, replace the hub mounting plate.
(3) Magnetic particle inspect the hub mounting plate in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If the damage is within the permitted serviceable limits, cadmium replate and bake the hub mounting plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If there is a relevant indication, replace the hub mounting plate.

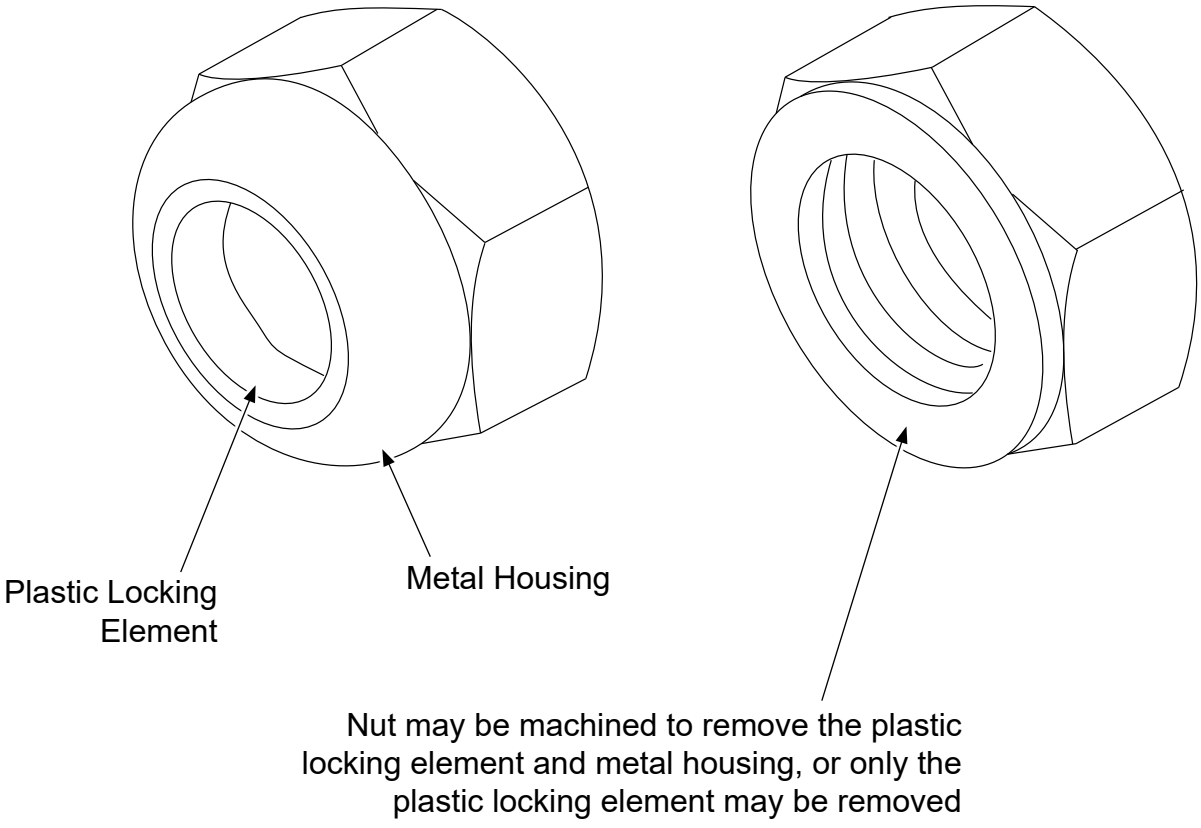


Hex Head Bolt
Figure 5-20

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
T.	HEX HEAD BOLT (Items 570, 580) Refer to Figure 5-20.		
	(1) Visually examine the hex head bolt for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.002 inch (0.05 mm). No more that 5% of the total unthreaded surface may be pitted. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). Pitting is not permitted in the fillet between the hex head and the grip, Area "A". Pitting must not affect the fit or function of the hex head bolt.	Remove corrosion product using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the hex head bolt. If the pitting is greater than the permitted serviceable limits, replace the hex head bolt.
	(2) Except for the threads, visually examine the hex head bolt for damage or scratches.	The maximum permitted depth of damage or a scratch is 0.002 inch (0.05 mm). Scratches or damage must not affect the fit or function of the hex head bolt. Pushed up material is not permitted.	Pushed up material may be removed with a thread file. Use of the thread file must not affect the fit or function of the hex head bolt. If the depth of a scratch or damage is greater than the permitted serviceable limits or if the scratch, damage, or repair affects the fit or function of the hex head bolt, replace the hex head bolt.
	(3) Visually examine the hex head bolt for circumferential scoring caused by installation and removal.	Circumferential scoring that reduces the diameter of the hex head bolt is not permitted. The minimum permitted OD in Area "A" is 0.370 inch (9.40 mm).	If scoring is greater than the permitted serviceable limits or if the OD in Area "A" is less than the permitted serviceable limits, replace the hex head bolt.
	(4) Visually examine the wrenching surfaces of the head of the hex head bolt for metal movement caused by wrenching.	Limited damage from wrenching is permitted, but it must be possible to torque the hex head bolt and metal movement must not interfere with the installation of the hex head bolt or cause damage to the hub.	Remove metal movement with a file or equivalent. Only corners may be repaired. Refacing a complete surface is not permitted. If metal movement is greater than the permitted serviceable limits, replace the hex head bolt.

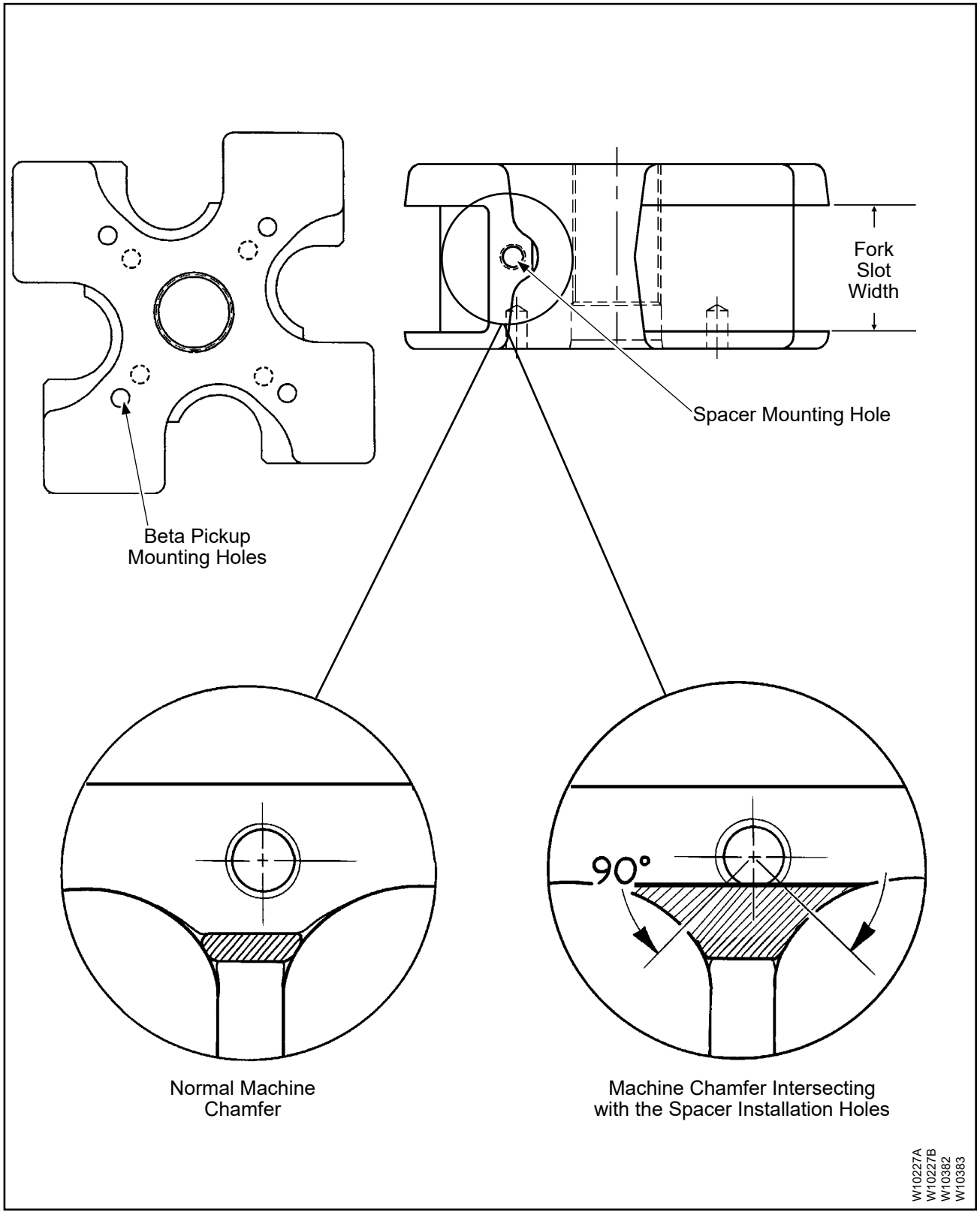
CAUTION: DO NOT USE MODIFIED A-2043-1 NUTS ON THE PROPELLER ASSEMBLY. A-2043-1 NUTS THAT HAVE BEEN MODIFIED ARE TO BE USED ONLY FOR THE HEX HEAD BOLT THREAD CHECK.



A-2043-1 Nut Modification
Figure 5-21

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
T.	HEX HEAD BOLT, CONTINUED (Items 570, 580) Refer to Figure 5-21.		
	(5) Visually examine the threads of the hex head bolt for damage and pitting.	A maximum total accumulation of 3/4 thread of damage and pitting is permitted. Thread damage must not cause damage to the mating part. An A-2043-1 nut with the plastic locking element removed should be able to be freely rotated by hand on the bolt threads. For the modification of the nut, refer to Figure 5-21.	Limited thread file repair is permitted, but must be considered as thread damage. If the damage and pitting is greater than the permitted serviceable limits, replace the hex head bolt.
	(6) Magnetic particle inspect each bolt in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the hex head bolt.
	(7) Visually examine the hex head bolt for cadmium plating coverage.	Cadmium plating must completely cover the bolt with the following exceptions: A few scratches and corners with cadmium plating missing, minor abrading of cadmium plating on the threads, or minor abrading of the cadmium plating on the hex head because of wrenching are permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the hex head bolt in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Fork
Figure 5-22

Component Inspection Criteria
Table 5-1

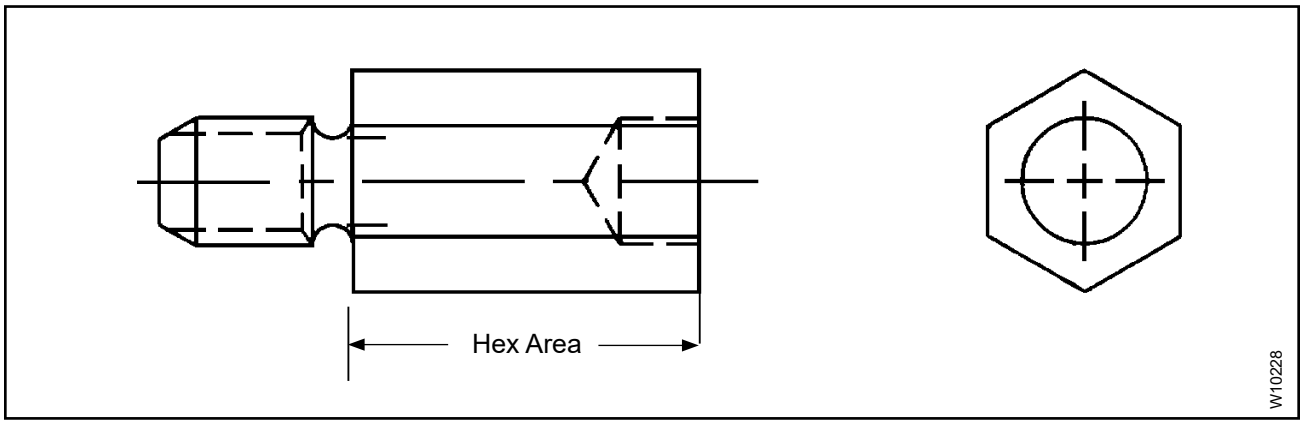
Inspect	Serviceable Limits	Corrective Action
U. FORK (Item 680) Refer to Figure 5-22.		
(1) Visually examine the pitch change rod engagement threads of the fork bore for damage.	One thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the fork.
(2) Visually examine the beta pickup mounting holes for thread damage.	One thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the fork.
(3) Visually examine the spacer mounting holes for thread damage, if applicable.	One thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the fork.
(4) Visually examine the tapered portion of the fork bore for wear, nicks, fretting or other damage.	The maximum permitted depth of damage is 0.003 inch (0.07 mm).	If the depth of damage is greater than the permitted serviceable limits, replace the fork.
(5) Visually examine the fork slots for damage.	The maximum permitted depth of damage is 0.006 inch (0.15 mm).	If the depth of damage is greater than the permitted serviceable limits, replace the fork.
(6) Measure the width of the fork slot.	The maximum fork slot width is 1.266 inches (32.15 mm).	If the slot width is greater than the permitted serviceable limits, replace the fork.
(7) Magnetic particle inspect the machined areas of the fork in accordance with the Magnetic Particle Inspection chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to strip the fork before magnetic particle inspection.	A relevant indication is not permitted	If there is a relevant indication, replace the fork.

Component Inspection Criteria
Table 5-1

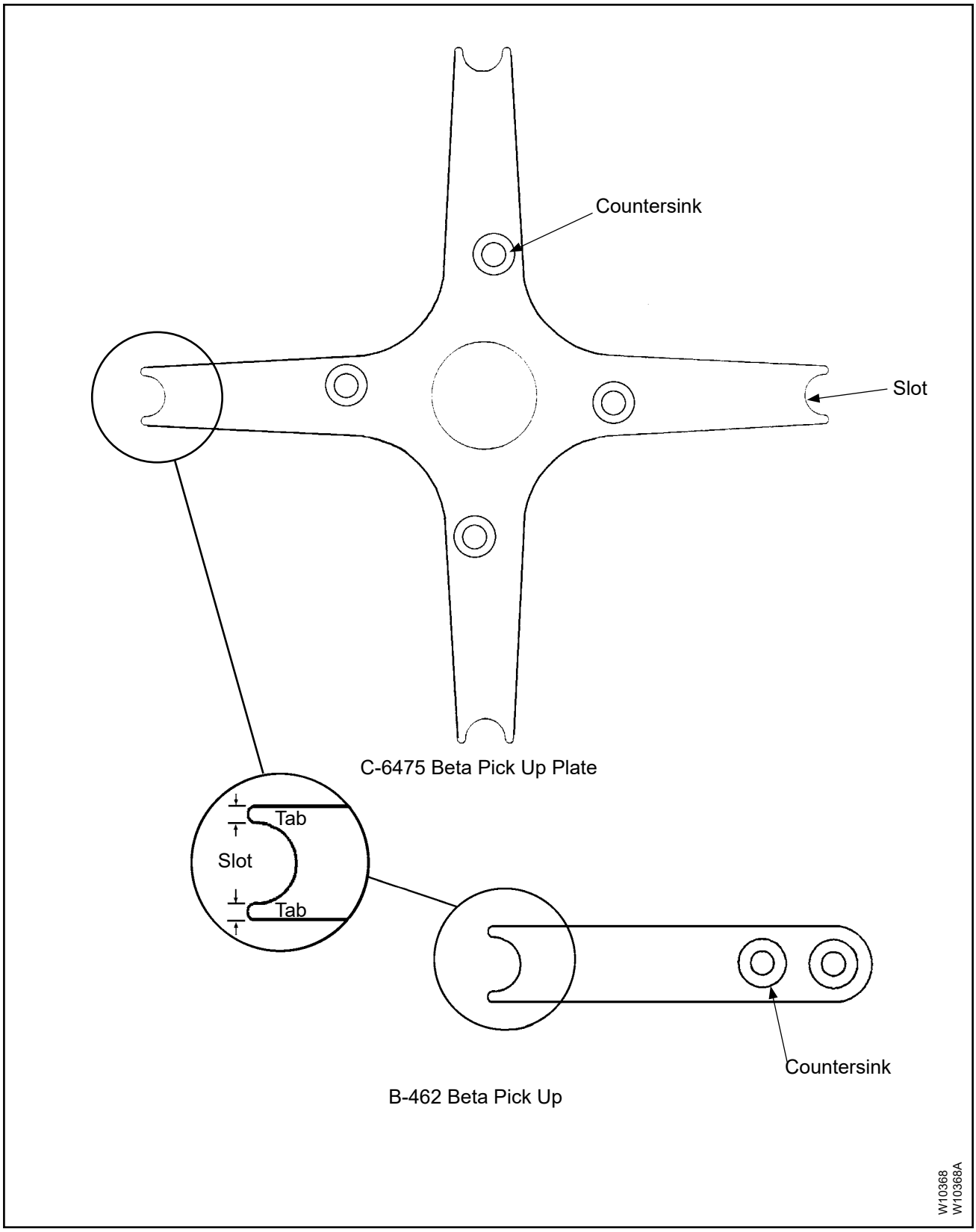
	Inspect	Serviceable Limits	Corrective Action
U.	FORK, CONTINUED (Item 680) Refer to Figure 5-22.		
(8)	Magnetic particle inspect the non-machined areas of the fork in accordance with the Magnetic Particle Inspection chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to strip the fork before magnetic particle inspection.	A shallow forging lap or fold indication must be removed.	Refer to the Repair chapter of this manual for the procedure for repair of the non-machined areas of the fork.
(9)	Visually examine the spacer attachment holes for too much chamfer. Refer to Figure 5-22.	The chamfer may intersect the spacer installation holes no more than 90 degrees of the circumference of the hole.	If the chamfer is not within the permitted serviceable limits, replace the fork.
(10)	Visually examine the cadmium plated surface of the fork (excluding the slots, threaded bore and tapered section of the bore) for wear, scratches, or other damage.	The maximum permitted depth of wear, scratches, or damage is 0.003 inch (0.07 mm).	If the depth of wear, scratches, or damage is greater than the permitted serviceable limits, replace the fork.
(11)	Visually examine the fork for cadmium plate coverage.	A few random scratches, corners with plating missing, normal wear of the plating from the threads, internal taper, and fork slots are permitted; otherwise, cadmium plate must cover the fork.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the fork in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
V.	EXTENSION BUMPER (FORK) (Item 690) Refer to Figure 5-23.		
	(1) Visually examine the extension bumper for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Light corrosion product may be removed with glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Cadmium replate the extension bumper in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the extension bumper.
	(2) Visually examine the spacer for damage.	A slight wrenching depression on the outer hex area of the extension bumper is permitted.	If damage is greater than the permitted serviceable limits, replace the extension bumper.
	(3) Visually examine the threads for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the extension bumper.
	(4) Visually examine the extension bumper for cadmium plate coverage.	A few random scratches and slight wear on the threads are permitted; otherwise, cadmium plate must completely cover the extension bumper.	If the coverage is less than the permitted serviceable limits, cadmium replate the spacer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



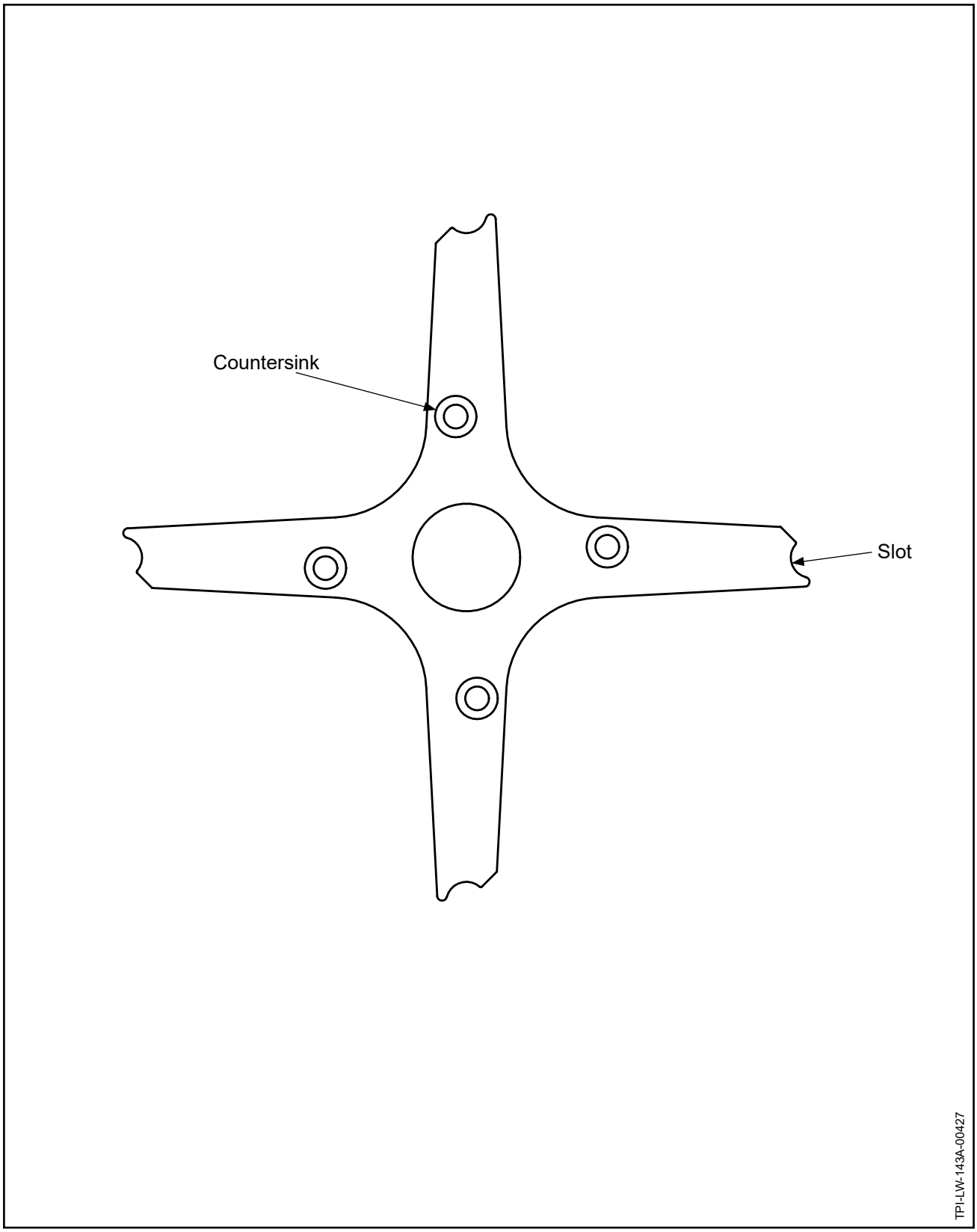
Extension Bumper (Fork)
Figure 5-23



B-462 and C-6475 Beta Pickup Plate
Figure 5-24

Component Inspection Criteria
Table 5-1

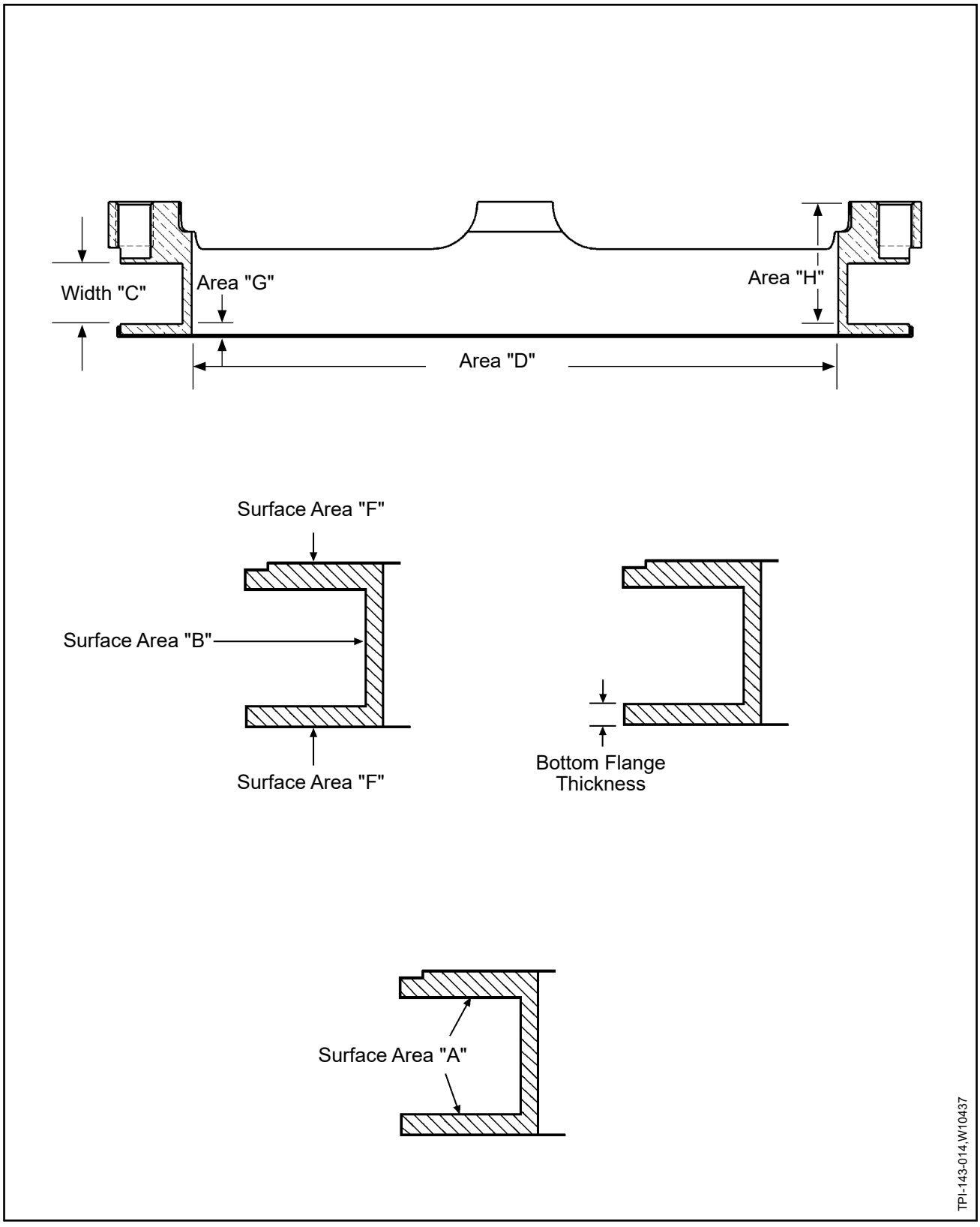
	Inspect	Serviceable Limits	Corrective Action
W.	BETA PICKUP PLATE p/n B-462 and C-6475 (Item 710) Refer to Figure 5-24.		
	NOTE: The B-462 beta pickup is no longer available from Hartzell Propeller Inc. Only the C-6475 beta pickup plate is available from Hartzell Propeller Inc. Switching from the B-462 to the C-6475 beta pickup requires a fork unit part number change from C-633 to C-6568. Refer to the Illustrated Parts List chapter		
	(1) Visually examine the beta pickup plate for corrosion product or pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Light corrosion product may be removed with glass bead cleaning. Cadmium replate the beta pickup plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If corrosion product or pitting is greater than the permitted serviceable limits, replace the beta pickup plate.
	(2) Visually examine the beta pickup plate for damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm).	Using an abrasive pad CM47 or equivalent, polish to a maximum depth of 0.005 inch (0.12 mm). If the damage is greater than the permitted serviceable limits, replace the beta pickup plate.
	(3) Visually examine each beta pickup plate slot for wear.	Tab widths must be even.	If the tab widths are not even, replace the beta pickup plate.
	(4) Visually examine the beta pickup plate for cadmium plating coverage.	A few random scratches and corners with plating missing are permitted; otherwise, complete coverage is required.	If coverage is less than the permitted serviceable limits, cadmium replate the beta pickup plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



103650 Beta Pickup Plate
Figure 5-25

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
X.	BETA PICKUP PLATE p/n 103650 (Item 710) Refer to Figure 5-25.		
	(1) Visually examine the beta pickup plate for corrosion product or pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Light corrosion product may be removed with glass bead cleaning. Cadmium replate the beta pickup plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If corrosion product or pitting is greater than the permitted serviceable limits, replace the beta pickup plate.
	(2) Visually examine the beta pickup plate for damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm).	Using an abrasive pad CM47 or equivalent, polish to a maximum depth of 0.005 inch (0.12 mm). If the damage is greater than the permitted serviceable limits, replace the beta pickup plate.
	(3) Visually examine each beta pickup plate slot for wear.	Wear that could affect the intended function of the part is not permitted.	If wear is greater than the permitted serviceable limits, replace the beta pickup plate.
	(4) Visually examine the beta pickup plate for cadmium plating coverage.	A few random scratches and corners with plating missing are permitted; otherwise, complete coverage is required.	If coverage is less than the permitted serviceable limits, cadmium replate the beta pickup plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



C-452 Beta Ring
Figure 5-26

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Y.	BETA RING p/n C-452 (Item 840) Refer to Figure 5-26.		
(1)	Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of impressions in this area is 0.004 inch (0.10 mm).	If the depth of impression is greaterthan the permitted serviceable limits, replace the beta ring.
(3)	Visually examine the sidewalls of the groove for any scratches (Area "A").	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pushed-up material adjacent to the scratch only. If the depth of the scratch is greater than the permitted serviceable limits, replace the beta ring.
(4)	Visually examine the groove backwall of the beta ring for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge must be repaired.	If the damage is within the permitted serviceable limits, refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
(5)	Measure the width of the groove in the beta ring (Width "C").	The maximum permitted width is 0.510 inch (12.95 mm).	If the width is greater than the permitted serviceable limits, replace the beta ring.
(6)	Measure the ID of the beta ring (Area "D").	The maximum permitted ID of the beta ring is 5.4270 inches (137.845 mm).	If the ID is greater than the permitted serviceable limits, replace the beta ring.
(7)	Measure the thickness of the bottom flange on the beta ring. Measure a minimum of four separate points on the bottom flange.	The minimum permitted thickness at any point on the bottom flange of the beta ring is 0.073 inch (1.85 mm).	If the thickness is less than the permitted serviceable limits, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Y.	BETA RING p/n C-452, CONTINUED (Item 840) Refer to Figure 5-26.		
(8)	Measure any depression or gouge on the outside surface of the beta ring (Area "F").	A depression or gouge must be removed. The maximum permitted depth for a depression or gouge is 0.007 inch (0.17 mm).	Refer to the Repair chapter of this manual if the damage is within the permitted limits. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
(9)	Visually examine the area beginning on the side opposite the lugs extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 (0.17 mm) is cause for retirement of the beta ring.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface using an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.846 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
(10)	Visually examine the inner surface, excluding "Area G", above, but including the inner surface of the lug areas, for grooves and scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is deeper than 0.007 inch (0.17 mm), polish the inner surface using an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.846 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
(11)	Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the beta ring.

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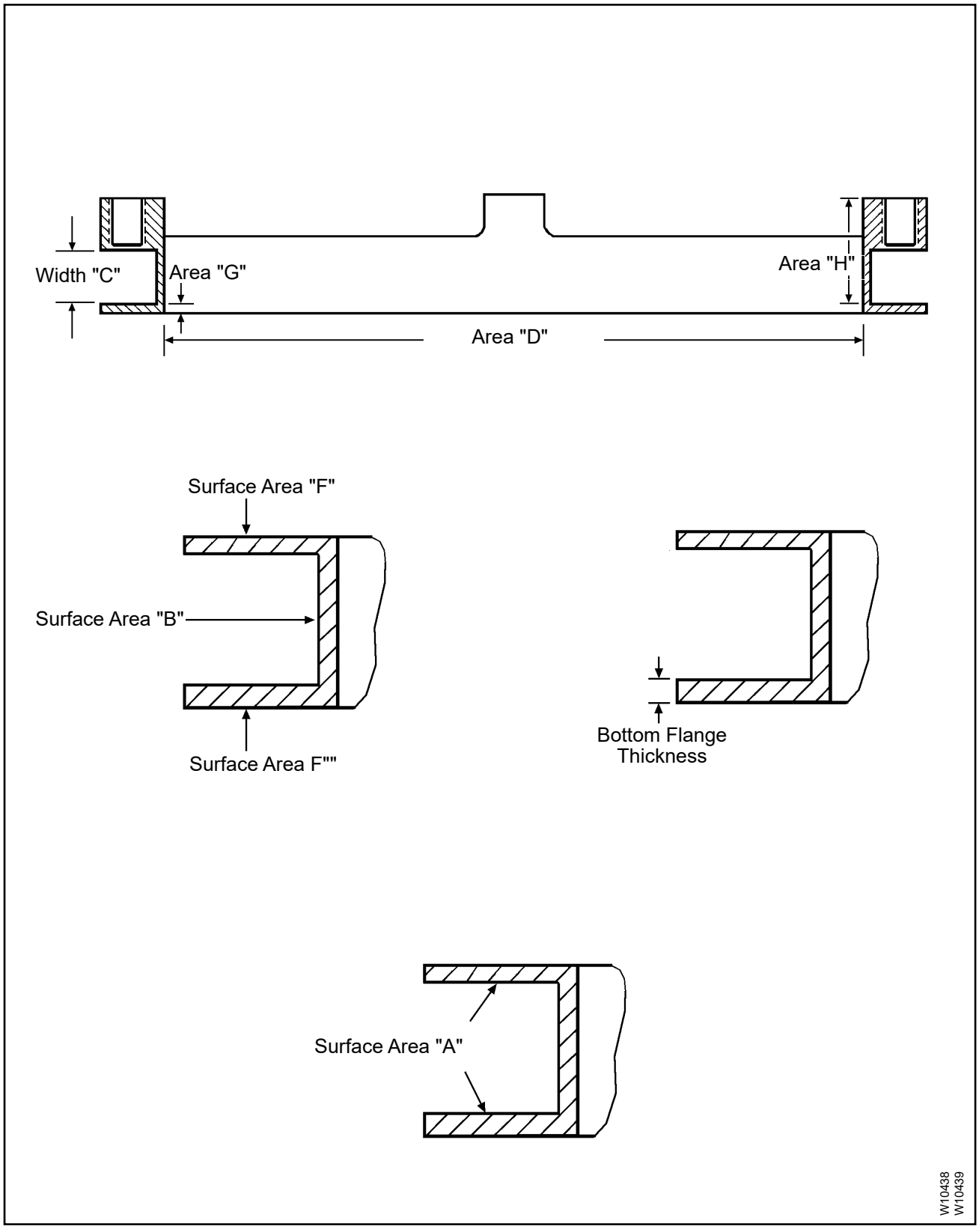

C-673 Beta Ring
Figure 5-27

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Z.	BETA RING p/n C-673 (Item 840) Refer to Figure 5-27.		
(1)	Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of impressions in this area is 0.004 inch (0.10 mm).	If the depth of impression is greaterthan the permitted serviceable limits, replace the beta ring.
(3)	Visually examine the sidewalls of the groove for any scratches (Area "A").	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pushed-up material adjacent to the scratch only. If the depth of the scratch is greater than the permitted serviceable limits, replace the beta ring.
(4)	Visually examine the groove backwall of the beta ring for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge must be repaired.	If the damage is within the permitted serviceable limits, refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
(5)	Measure the width of the groove in the beta ring (Width "C").	The maximum permitted width is 0.510 inch (12.95 mm).	If the width is greater than the permitted serviceable limits, replace the beta ring.
(6)	Measure the ID of the beta ring (Area "D").	The maximum permitted ID of the beta ring is 6.557 inches (166.54 mm).	If the ID is greater than the permitted serviceable limits, replace the beta ring.
(7)	Measure the thickness of the bottom flange on the beta ring. Measure a minimum of four separate points on the bottom flange.	The minimum permitted thickness at any point on the bottom flange of the beta ring is 0.073 inch (1.85 mm).	If the thickness is less than the permitted serviceable limits, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Z.	BETA RING p/n C-673, CONTINUED (Item 840) Refer to Figure 5-27.		
	(8) Measure any depression or gouge on the outside surface of the beta ring (Area "F").	A depression or gouge must be removed. The maximum permitted depth for a depression or gouge is 0.007 inch (0.17 mm).	Refer to the Repair chapter of this manual if the damage is within the permitted limits. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
	(9) Visually examine the area beginning on the side opposite the lugs extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 (0.17 mm) is cause for retirement of the beta ring.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface using an abrasive pad CM47 or equivalent, maintaining a maximum ID of 6.557 inches (166.54 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
	(10) Visually examine the inner surface, excluding "Area G", above, but including the inner surface of the lug areas, for grooves and scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface using an abrasive pad CM47 or equivalent, maintaining a maximum ID of 6.557 inches (166.54 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
	(11) Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the beta ring.

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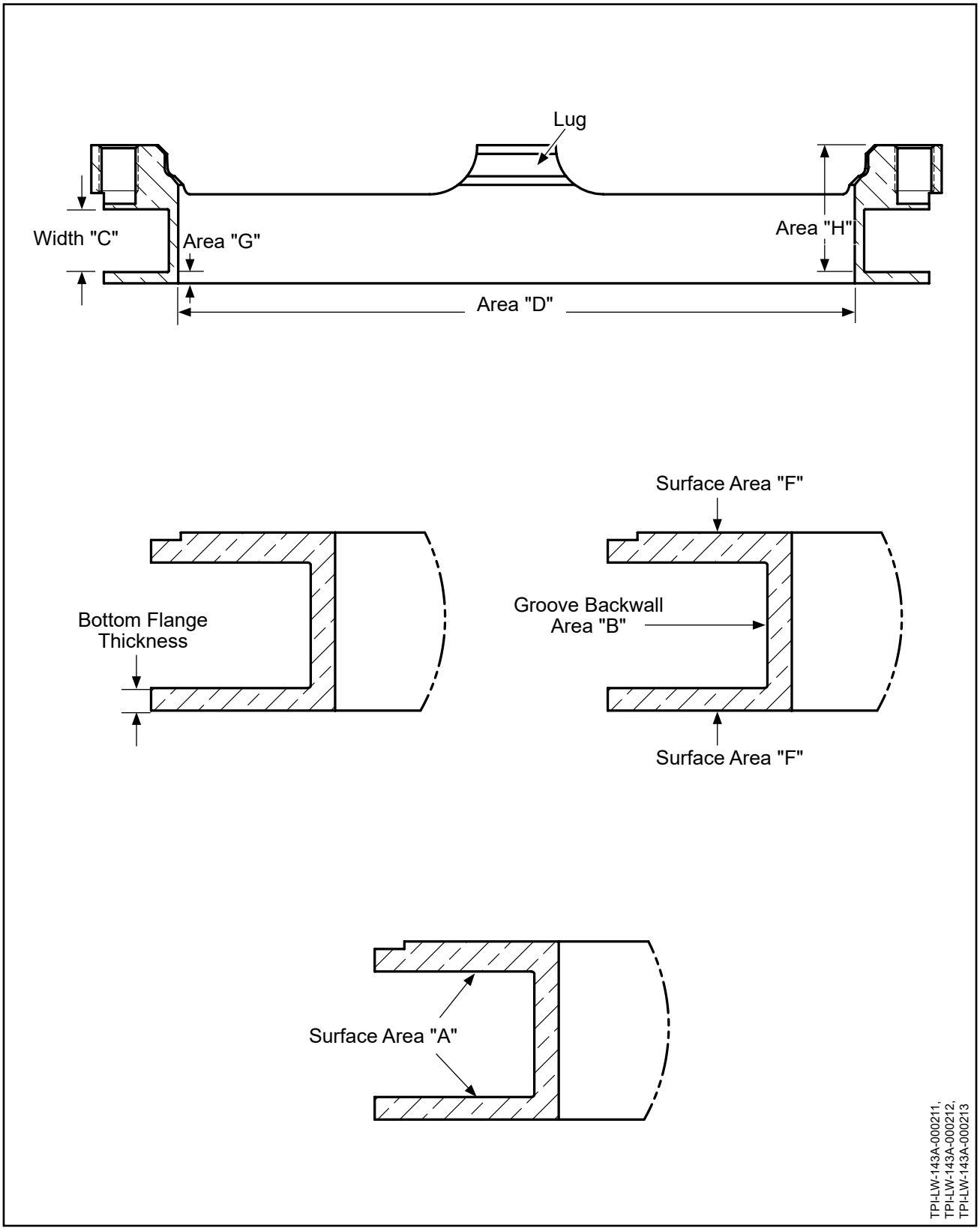


107255 Beta Ring
Figure 5-28

Component Inspection Criteria
Table 5-1

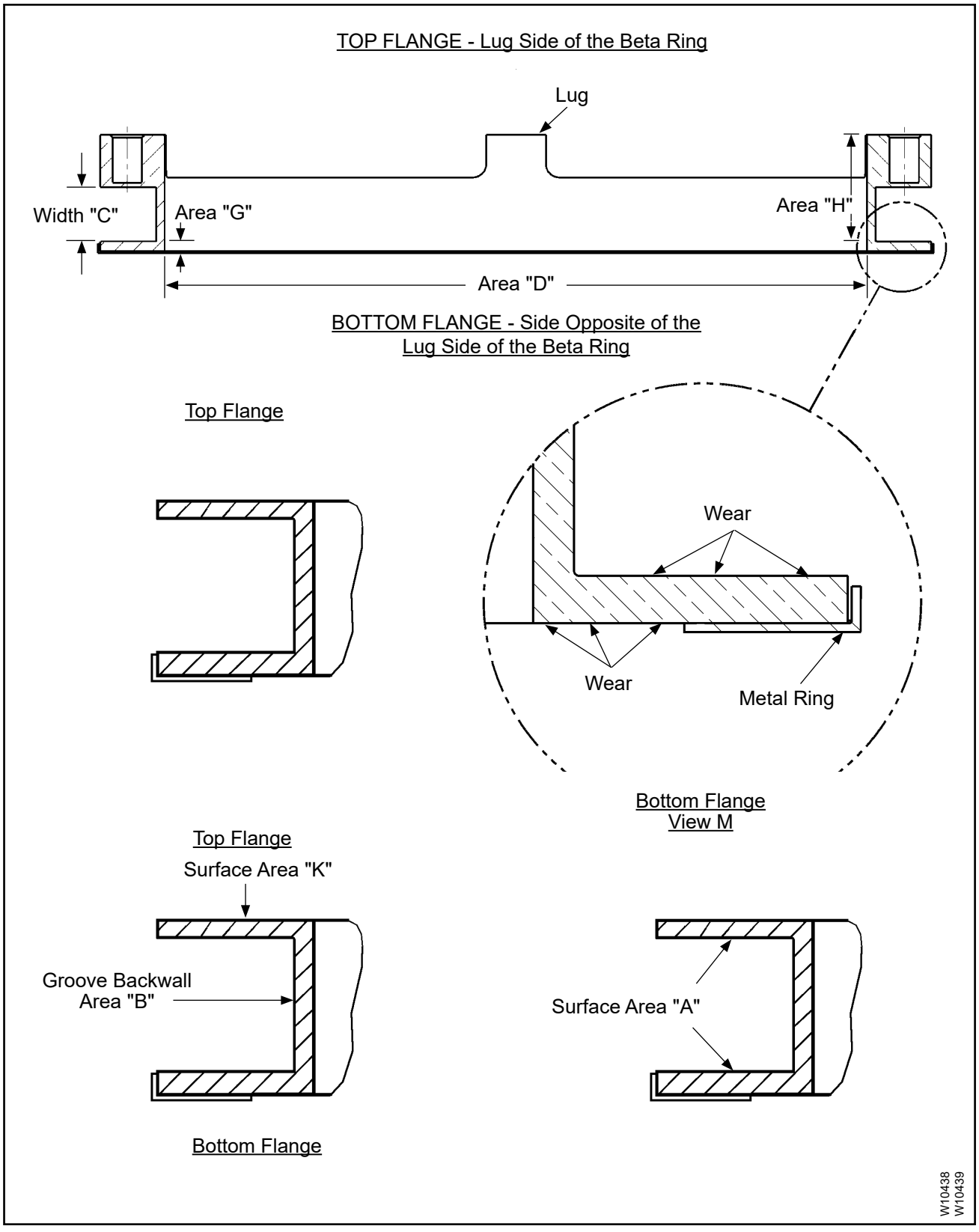
	Inspect	Serviceable Limits	Corrective Action
AA.	BETA RING p/n 107255 (Item 840) Refer to Figure 5-28.		
(1)	Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of impressions in this area is 0.004 inch (0.10 mm).	If the depth of impression is greater than the permitted serviceable limits, replace the beta ring.
(3)	Visually examine the sidewalls of the groove for any scratches (Area "A") .	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pushed-up material adjacent to the scratch only. If the depth of a scratch is greater than the permitted serviceable limits, replace the beta ring.
(4)	Visually examine the groove backwall of the beta ring for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge that can not be repaired is not permitted.	If the damage is within the permitted serviceable limits, refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
(5)	Measure the width of the groove in the beta ring (Width "C").	The maximum permitted width of the groove is 0.510 inch (12.95 mm).	If the width of the groove is greater than the permitted serviceable limits, replace the beta ring.
(6)	Measure the ID of the beta ring (Area "D").	The maximum permitted ID of the beta ring is 5.4270 inches (137.845 mm).	If the ID of the beta ring is greater than the permitted serviceable limits, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AA.	BETA RING p/n 107255, CONTINUED (Item 840) Refer to Figure 5-28.		
(7)	Measure the thickness of the bottom flange on the beta ring. Measure a minimum of four separate points on the bottom flange.	The minimum permitted thickness at any point on the bottom flange of the beta ring is 0.073 inch (1.85 mm).	If the thickness is less than the permitted serviceable limits, replace the beta ring.
(8)	Measure any depression or gouge on the outside surface of the beta ring (Area "F").	A depression or gouge must be removed. The maximum permitted depth of a depression or repair is 0.007 inch (0.17 mm).	Refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure if the damage is within the permitted limits. If damage or repair is greater than the permitted serviceable limits, replace the beta ring.
(9)	Visually examine the ID area beginning on the side opposite the lugs extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 inch (0.17 mm) is not permitted.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface with an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.845 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.
(10)	Excluding "Area G", above, but including the inner surface of the lug areas, visually examine the inner surface for grooves or scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is deeper than 0.007 inch (0.17 mm), polish the inner surface with an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.845 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AA.	BETA RING p/n 107255, CONTINUED (Item 840) Refer to Figure 5-28.		
	(11) Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the beta ring.



103825 Beta Ring Unit
Figure 5-29

Component Inspection Criteria
Table 5-1

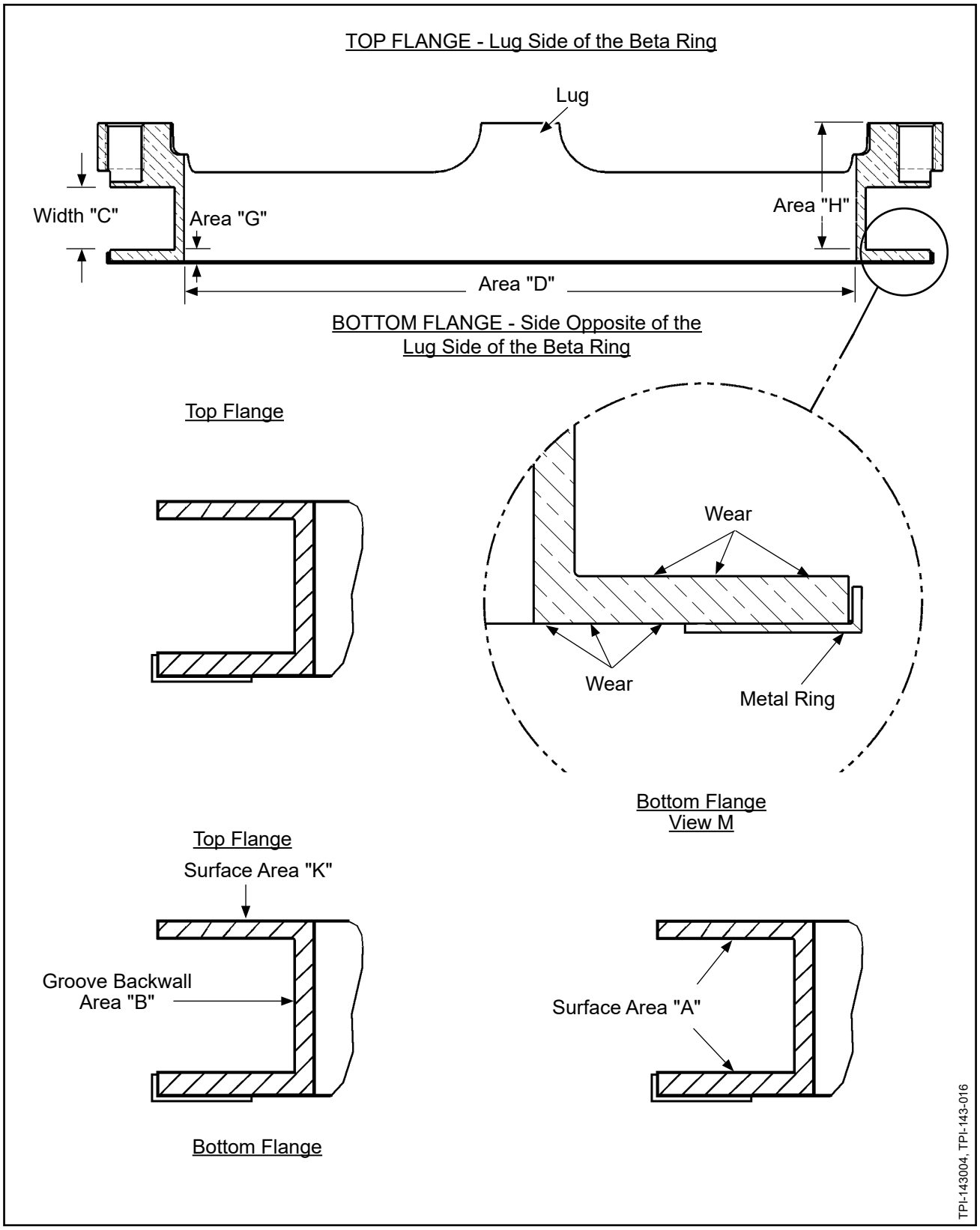
	Inspect	Serviceable Limits	Corrective Action
AB.	BETA RING UNIT p/n 103825 (Item 840) Refer to Figure 5-29.		
(1)	Visually examine the beta ring unit for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring unit.
(2)	Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of impressions in this area is 0.004 inch (0.10 mm).	If the depth of impression is greater than the permitted serviceable limits, replace the beta ring unit.
(3)	Visually examine the sidewalls of the groove for any scratches (Area "A") .	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	Using an emery cloth or equivalent, polish to remove pushed-up material adjacent to the scratch only. If the depth of a scratch is greater than the permitted serviceable limits, replace the beta ring unit.
(4)	Visually examine the groove backwall of the beta ring unit for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge that can not be repaired is not permitted.	If the damage is within the permitted serviceable limits, refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted serviceable limits, replace the beta ring unit.
(5)	Measure the width of the groove in the beta ring unit (Width "C").	The maximum permitted width of the groove is 0.510 inch (12.95 mm).	If the width of the groove is greater than the permitted serviceable limits, replace the beta ring unit.
(6)	Measure the ID of the beta ring unit (Area "D").	The maximum permitted ID of the beta ring is 6.552 inches (166.42 mm).	If the ID of the beta ring is greater than the permitted serviceable limits, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AB.	BETA RING UNIT p/n 103825, CONTINUED (Item 840) Refer to Figure 5-29.		
(7)	For the bottom flange of the beta ring unit, visually examine for wear. Refer to View M.	The minimum permitted thickness at any point on the bottom flange of the beta ring is 0.073 inch (1.85 mm).	If the thickness is less than the permitted serviceable limits, replace the beta ring unit.
(8)	Measure any depression or gouge on the outside surface of the beta ring unit (Area "K") .	A depression or gouge must be removed. The maximum permitted depth of a depression or repair is 0.007 inch (0.17 mm).	Refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure if the damage is within the permitted limits. If damage or repair is greater than the permitted serviceable limits, replace the beta ring unit.
(9)	Visually examine the ID area beginning on the side opposite the lugs extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 inch (0.17 mm) is not permitted.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface with emery cloth, maintaining a maximum ID of 6.552 inches (166.42 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.
(10)	Excluding "Area G", above, but including the inner surface of the lug areas, visually examine the inner surface for grooves or scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is deeper than 0.007 inch (0.17 mm), polish the inner surface with emery cloth, maintaining a maximum ID of 6.552 inches (166.42 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AB.	BETA RING UNIT p/n 103825, CONTINUED (Item 840) Refer to Figure 5-29.		
	(11) Visually examine the 103826 beta switch indicator ring that is bonded to the 103825 beta ring unit.	The 103826 beta switch indicator ring must be bonded tightly to the 103825 beta ring unit.	If the 103826 beta switch indicator ring is not tightly bonded to the 103825 beta ring unit, reinstall the beta switch indicator ring in accordance with the section, "Bonding the Beta Switch Indicator Ring to the Beta Ring Unit" in the Special Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	(12) Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the beta ring.



101383 Beta Ring Unit
Figure 5-30

Component Inspection Criteria
Table 5-1

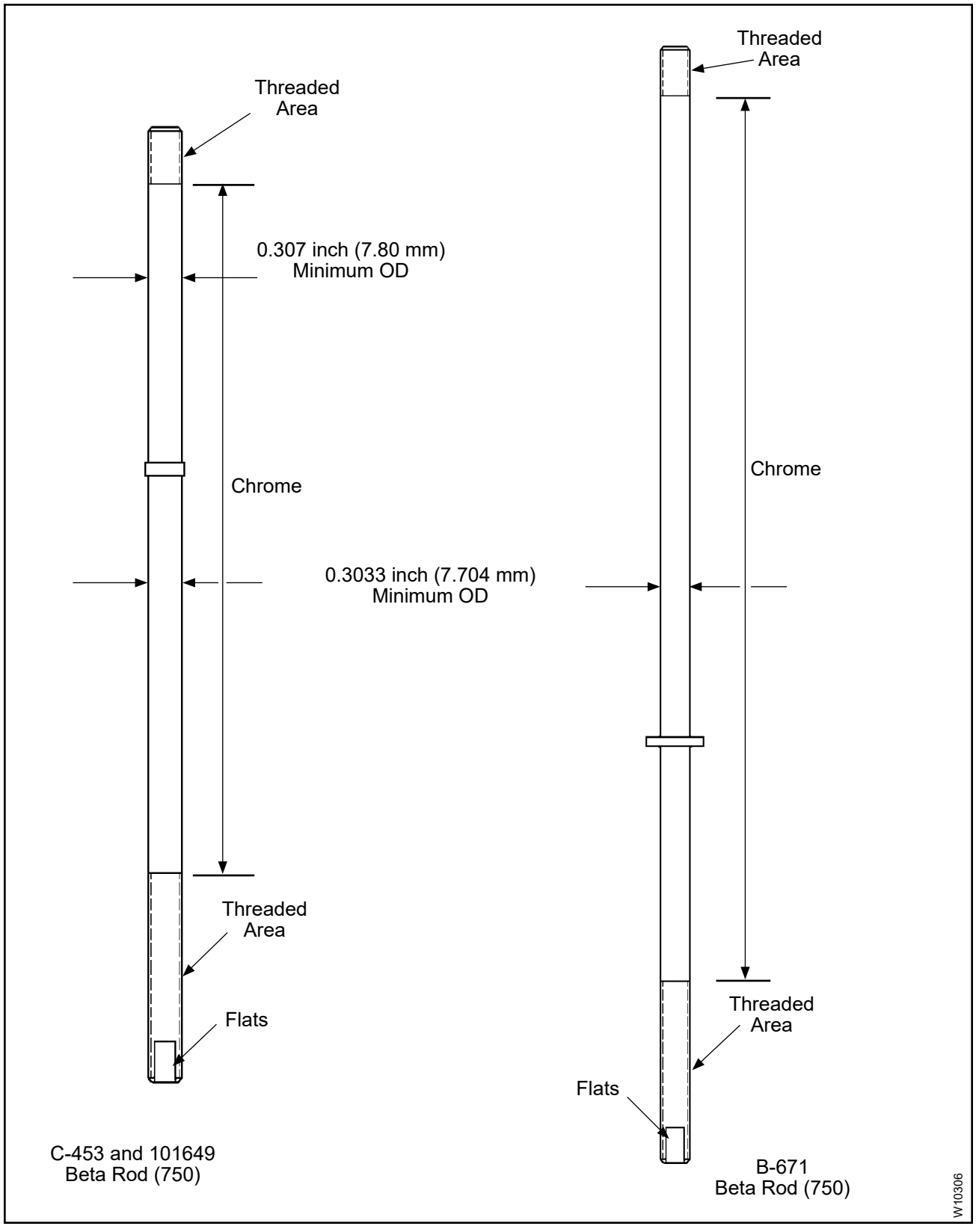
	Inspect	Serviceable Limits	Corrective Action
AC.	BETA RING UNIT p/n 101383 (Item 840) Refer to Figure 5-30.		
(1)	Visually examine the beta ring unit for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring unit.
(2)	Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of impressions in this area is 0.004 inch (0.10 mm).	If the depth of impression is greater than the permitted serviceable limits, replace the beta ring unit.
(3)	Visually examine the sidewalls of the groove for any scratches (Area "A") .	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	Using an emery cloth or equivalent, polish to remove pushed-up material adjacent to the scratch only. If the depth of a scratch is greater than the permitted serviceable limits, replace the beta ring unit.
(4)	Visually examine the groove backwall of the beta ring unit for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge that can not be repaired is not permitted.	If the damage is within the permitted serviceable limits, refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted serviceable limits, replace the beta ring unit.
(5)	Measure the width of the groove in the beta ring unit (Width "C").	The maximum permitted width of the groove is 0.510 inch (12.95 mm).	If the width of the groove is greater than the permitted serviceable limits, replace the beta ring unit.
(6)	Measure the ID of the beta ring unit (Area "D").	The maximum permitted ID of the beta ring is 5.4270 inches (137.845 mm).	If the ID of the beta ring unit is greater than the permitted serviceable limits, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AC.	BETA RING UNIT p/n 101383, CONTINUED (Item 840) Refer to Figure 5-30.		
(7)	For the bottom flange of the beta ring unit, visually examine for wear. Refer to View M.	Wear that decreases the flange thickness is not permitted.	If there is wear that is greater than the permitted serviceable limits, replace the beta ring unit.
(8)	Measure any depression or gouge on the outside surface of the beta ring unit (Area "K") .	A depression or gouge must be removed. The maximum permitted depth of a depression or repair is 0.007 inch (0.17 mm).	Refer to the section, "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure if the damage is within the permitted limits. If damage or repair is greater than the permitted serviceable limits, replace the beta ring unit.
(9)	Visually examine the ID area beginning on the side opposite the lugs extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 inch (0.17 mm) is not permitted.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface with an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.845 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.
(10)	Excluding "Area G", above, but including the inner surface of the lug areas, visually examine the inner surface for grooves or scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is deeper than 0.007 inch (0.17 mm), polish the inner surface with an abrasive pad CM47 or equivalent, maintaining a maximum ID of 5.4270 inches (137.845 mm). If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

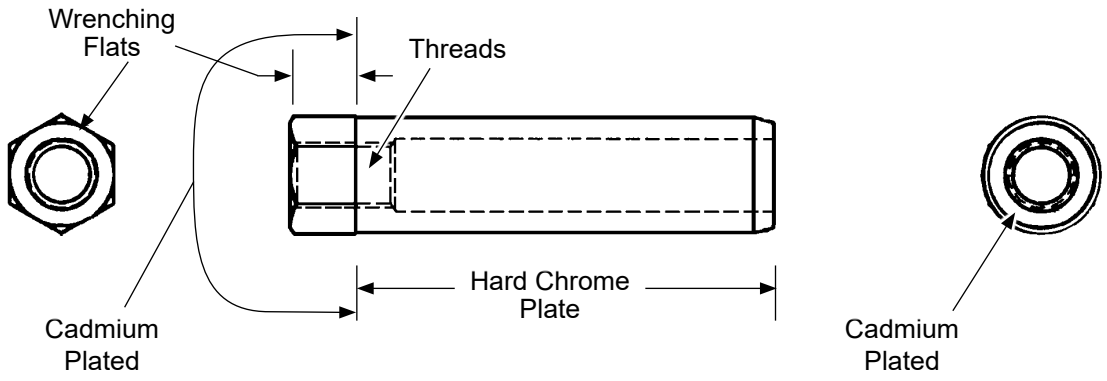
	Inspect	Serviceable Limits	Corrective Action
AC.	BETA RING UNIT p/n 101383, CONTINUED (Item 840) Refer to Figure 5-30.		
	(11) Visually examine the B-3333 beta switch indicator ring that is bonded to the 101383 beta ring unit.	The B-3333 beta switch indicator ring must be bonded tightly to the 101383 beta ring unit.	If the B-3333 beta switch indicator ring is not tightly bonded to the 101383 beta ring unit, reinstall the beta switch indicator ring in accordance with the section, "Bonding the Beta Switch Indicator Ring to the Beta Ring Unit" in the Special Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	(12) Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the beta ring.



Beta Rod
Figure 5-31

Component Inspection Criteria
Table 5-1

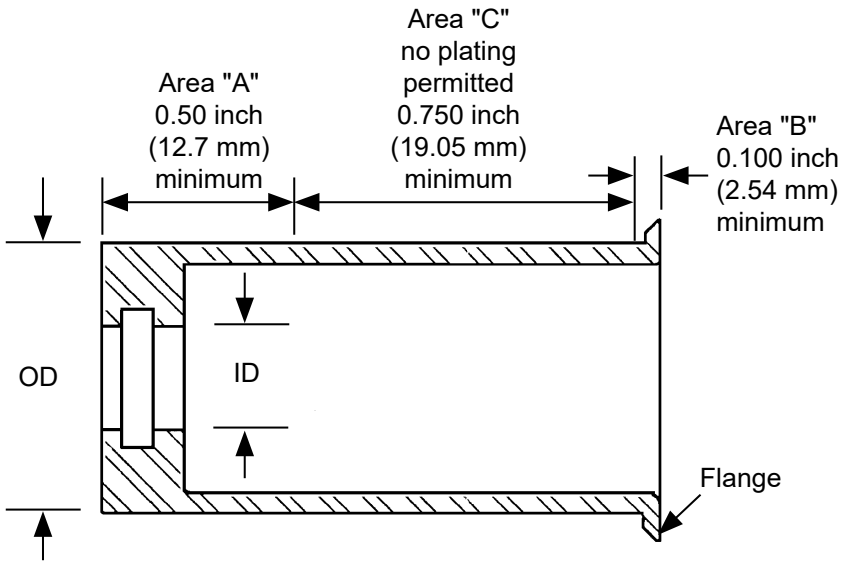
	Inspect	Serviceable Limits	Corrective Action
AD.	BETA ROD (Item 750) Refer to Figure 5-31.		
(1)	Visually examine each beta rod for bending or distortion.	Bending or distortion is not permitted.	If there is bending or distortion, replace the beta rod.
(2)	Visually examine each beta rod for damage that penetrates the chrome surface.	Damage must not penetrate the chrome surface.	If the damage is greater than the permitted serviceable limits, replace the beta rod.
(3)	Visually examine the condition of the threaded areas of each beta rod.	Damage or wear must not exceed 10 degrees of circumference	If the damage or wear is greater than the permitted serviceable limits, replace the beta rod.
(4)	Visually examine the cadmium plating coverage on the threaded areas of the beta rod.	Except for a few minor scratches and corners with cadmium plating missing, cadmium plating must completely cover the threaded areas of the beta rod.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the beta rod in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(5)	Measure the OD of each beta rod.	Refer to Figure 5-31 for the applicable limits.	If the OD is less than the permitted serviceable limits, replace the beta rod.
(6)	Visually examine the flats of the beta rod.	Sufficient flat must exist without damage to permit an open-end wrench to engage.	If a wrench will not engage, replace the beta rod.
(7)	Magnetic particle inspect each beta rod in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the beta rod.



Threaded Beta Sleeve
Figure 5-32

Component Inspection Criteria
Table 5-1

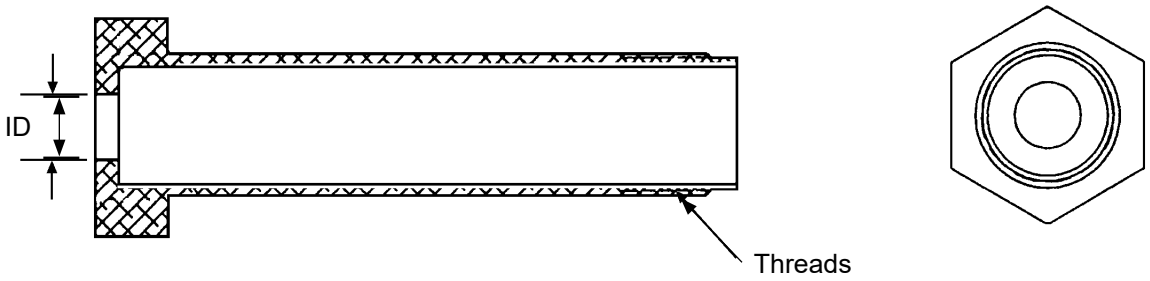
	Inspect	Serviceable Limits	Corrective Action
AE.	THREADED BETA SLEEVE (Item 740) Refer to Figure 5-32.		
(1)	Visually examine the beta sleeve for corrosion product and pitting.	In cadmium plated areas corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). In areas of hard chrome plate, corrosion product or pitting is not permitted.	Remove corrosion product with glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A, (61-01-02). If the corrosion product cannot be removed, replace the beta sleeve. If depth of pitting is greater than the permitted serviceable limits, replace the beta sleeve.
(2)	Visually examine the threads for damage.	One thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the threaded beta sleeve.
(3)	Visually examine the wrenching flats for damage.	Sufficient flat surface must remain on two opposing flats to permit an open-end wrench to engage.	If a wrench will not engage, replace the threaded beta sleeve.
(4)	Visually examine the threaded beta sleeve for hard chromium coverage.	Except for a few scratches and corners with hard chromium coating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, replace the threaded beta sleeve.
(5)	Visually examine the beta sleeve for damage in the remaining areas.	The maximum permitted depth of damage is 0.005 inch (0.12 mm). Damage must not interfere with installation or operation of the beta adjust nut.	If the depth of damage is greater than the permitted serviceable limits, replace the threaded beta sleeve.



B-454 Beta Spring Retainer
Figure 5-33

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AF.	BETA SPRING RETAINER (Item 780) Refer to Figure 5-33.		
(1)	Visually examine the beta spring retainer for corrosion product or pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.003 inch (0.07 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the beta spring retainer. If the pitting is greater than the permitted serviceable limits, replace the beta spring retainer.
(2)	Visually examine the beta spring retainer for wear or damage.	The maximum permitted depth of wear or damage is 0.003 inch (0.07 mm).	If the damage is greater than the permitted serviceable limits, replace the beta spring retainer.
(3)	Visually examine the beta spring retainer OD for wear. If there is wear, measure the OD.	The minimum permitted OD is 0.822 inch (20.87 mm) with cadmium plate. The minimum OD permitted before plating is 0.821 inch (20.85 mm).	Using an abrasive pad CM47 or equivalent, remove any pushed up material that may interfere with the installation or operation of the beta spring retainer. If the wear or damage is greater than the permitted serviceable limits, replace the beta spring retainer.
(4)	Visually examine the beta spring retainer ID for wear. If there is wear, measure the ID.	The maximum permitted ID is 0.320 inch (8.12 mm).	If the ID is greater than the permitted serviceable limits, replace the beta spring retainer.
(5)	Visually examine the flange for damage or cracks.	Damage or cracks between the flange and tube part of the beta spring retainer are not permitted.	If there is damage or a crack, replace the beta spring retainer.
(6)	Visually examine the beta spring retainer for cadmium plating coverage in Area "A" and Area "B".	A few random scratches and corners with cadmium plate missing is permitted; otherwise, complete coverage in areas "A" and "B" is required.	If cadmium plate coverage is less than the permitted serviceable limits, apply masking material as shown for Area "C" of Figure 5-33 and cadmium replate the beta spring retainer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

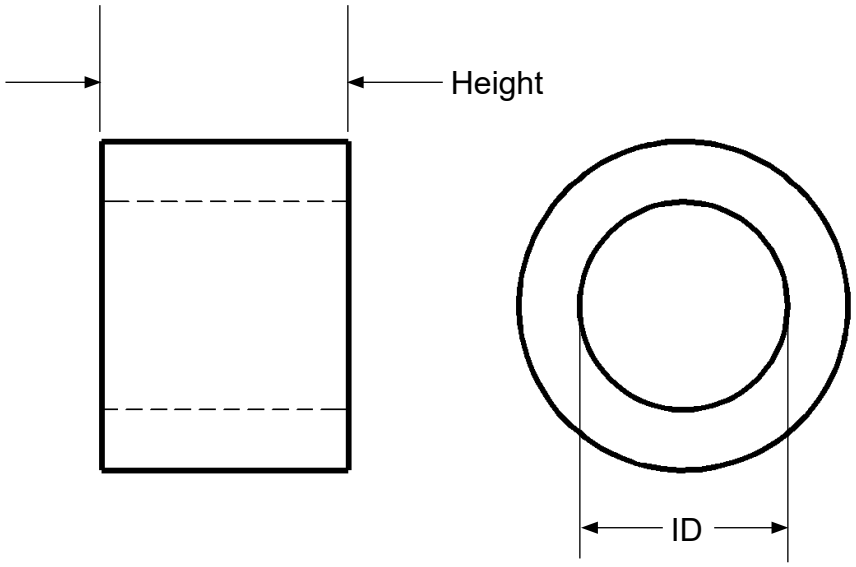


W10364

B-2837 Beta Spring Tube
Figure 5-34

Component Inspection Criteria
Table 5-1

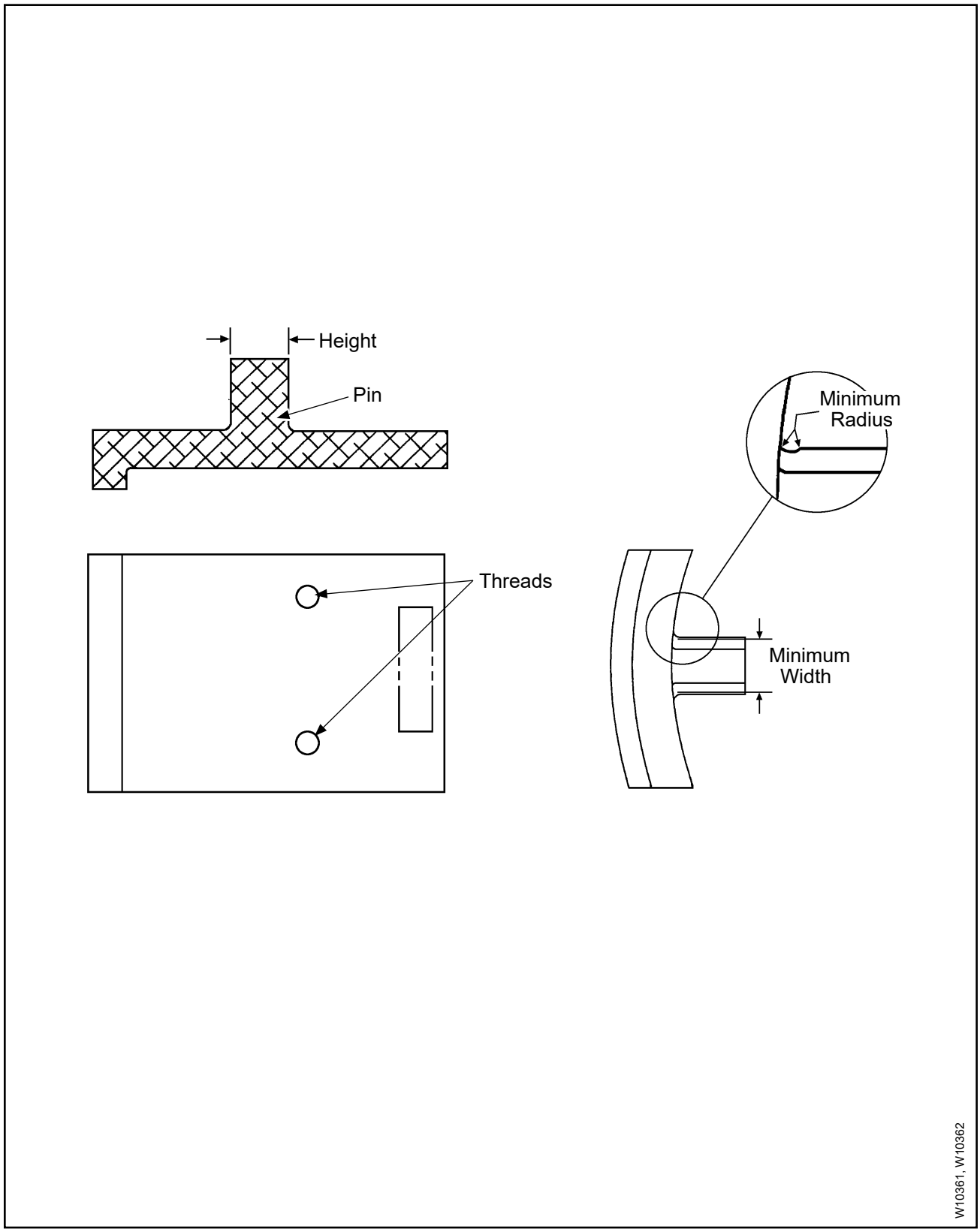
	Inspect	Serviceable Limits	Corrective Action
AG.	BETA SPRING TUBE (Item 790) Refer to Figure 5-34.		
(1)	Visually examine the beta spring tube for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the beta spring tube. If the damage is greater than the permitted serviceable limits, replace the beta spring tube.
(2)	Visually examine the beta spring tube for wear or damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm).	If damage is greater than the permitted serviceable limits, replace the beta spring tube.
(3)	Visually examine the beta spring tube threads for damage.	A maximum of one thread total accumulated damage is permitted.	If damage is greater than the permitted serviceable limits, replace the beta spring tube.
(4)	Visually examine the beta spring tube for anodize coverage.	Except for a few scratches and corners with anodize coating missing, complete coverage is required.	Anodize the beta spring tube in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(5)	Visually examine the beta spring tube wrenching flats for damage.	Sufficient flat surface must remain on two opposing flats to permit an open-end wrench to engage.	If damage is greater than the permitted serviceable limits, replace the beta spring tube.
(6)	Visually examine the beta spring tube ID opening for wear. If there is wear, measure the beta spring tube ID.	The maximum permitted ID is 0.356 inch (9.04 mm).	If the ID is greater than the permitted serviceable limits, replace the beta spring tube.



Spacer
Figure 5-35

Component Inspection Criteria
Table 5-1

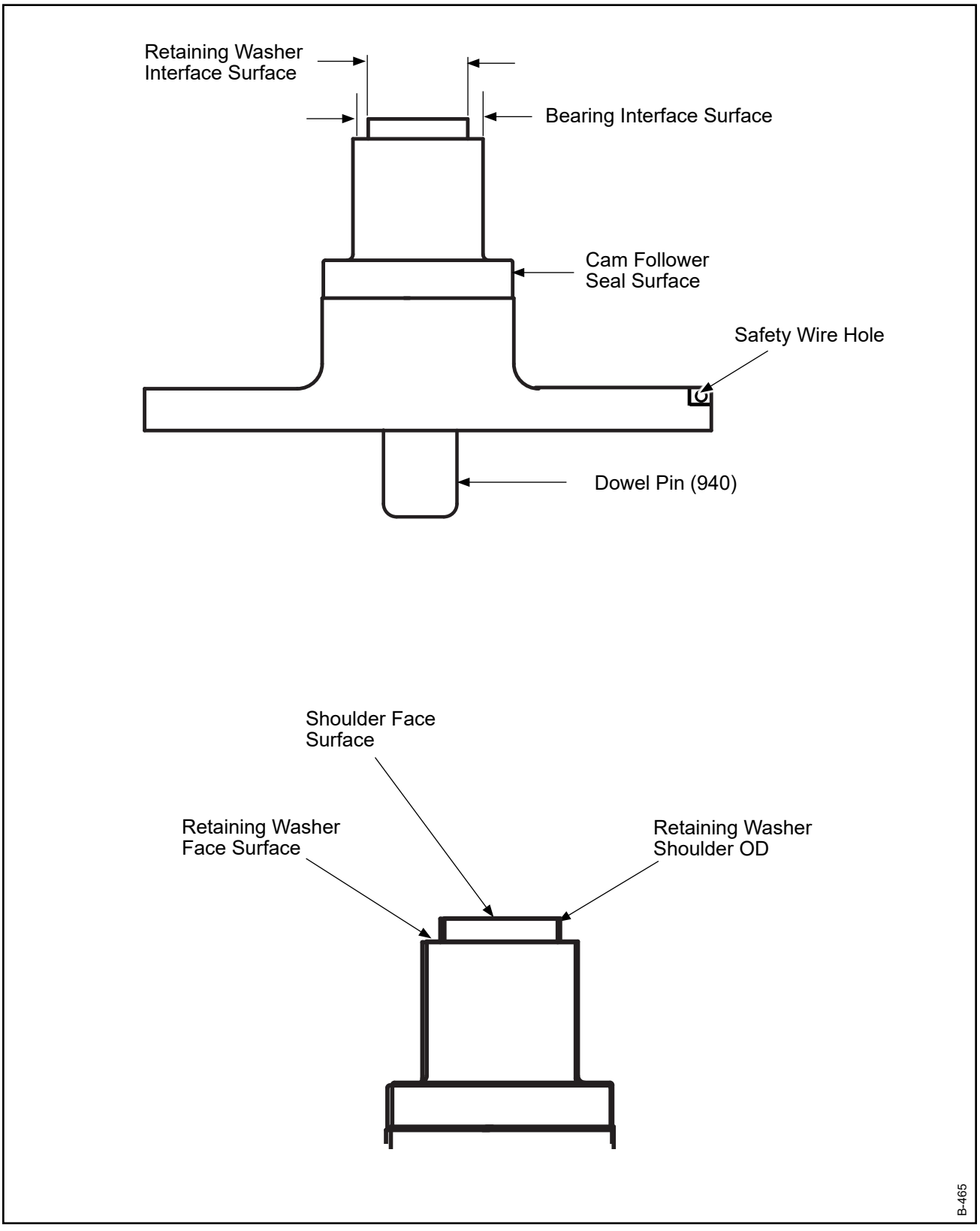
	Inspect	Serviceable Limits	Corrective Action
AH.	SPACER (Item 815) Refer to Figure 5-35.		
(1)	Visually examine the spacer for corrosion product, pitting, damage, or wear.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting, damage, or wear is 0.003 inch (0.07 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).If the pitting, damage, or wear is greater than the permitted serviceable limits or if the corrosion product cannot be removed, replace the spacer.
(2)	If the spacer has wear, measure the height of the spacer at eight equally spaced locations around the circumference of the spacer.	The minimum permitted height of the spacer is 0.362 inch (9.20 mm). The maximum permitted variation of height is 0.003 inch (0.07 mm).	If the height of the spacer is less than the permitted serviceable limits or the variation of height is greater than the permitted serviceable limits, replace the spacer.
(3)	If the spacer has wear in the ID, measure the ID of the spacer.	The maximum permitted ID of the spacer is 0.325 inch (8.25 mm).	If the ID of the spacer is greater than the permitted serviceable limits, replace the spacer.
(4)	Magnetic particle inspect the spacer in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the spacer.



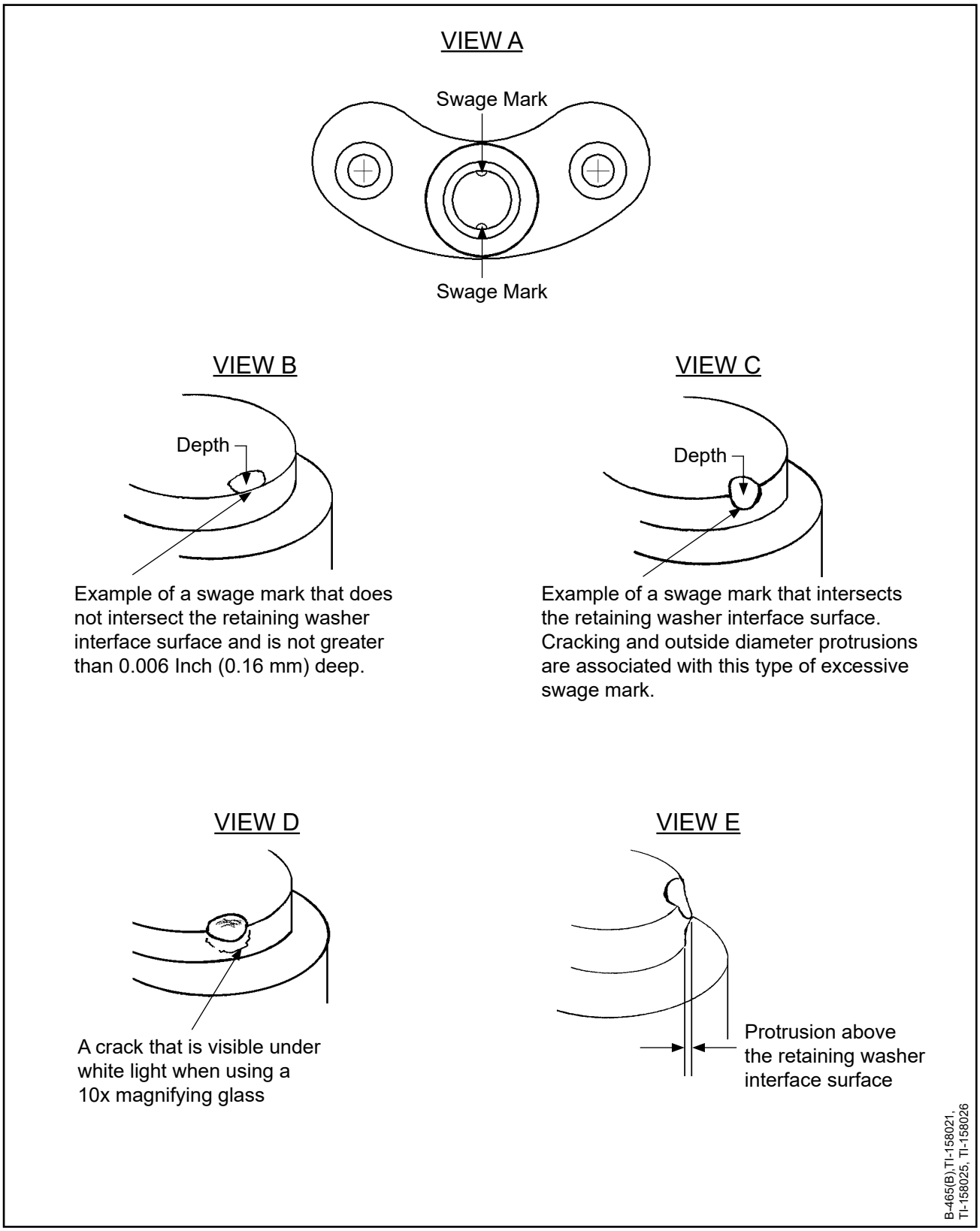
Yoke Tappet
Figure 5-36

Component Inspection Criteria
Table 5-1

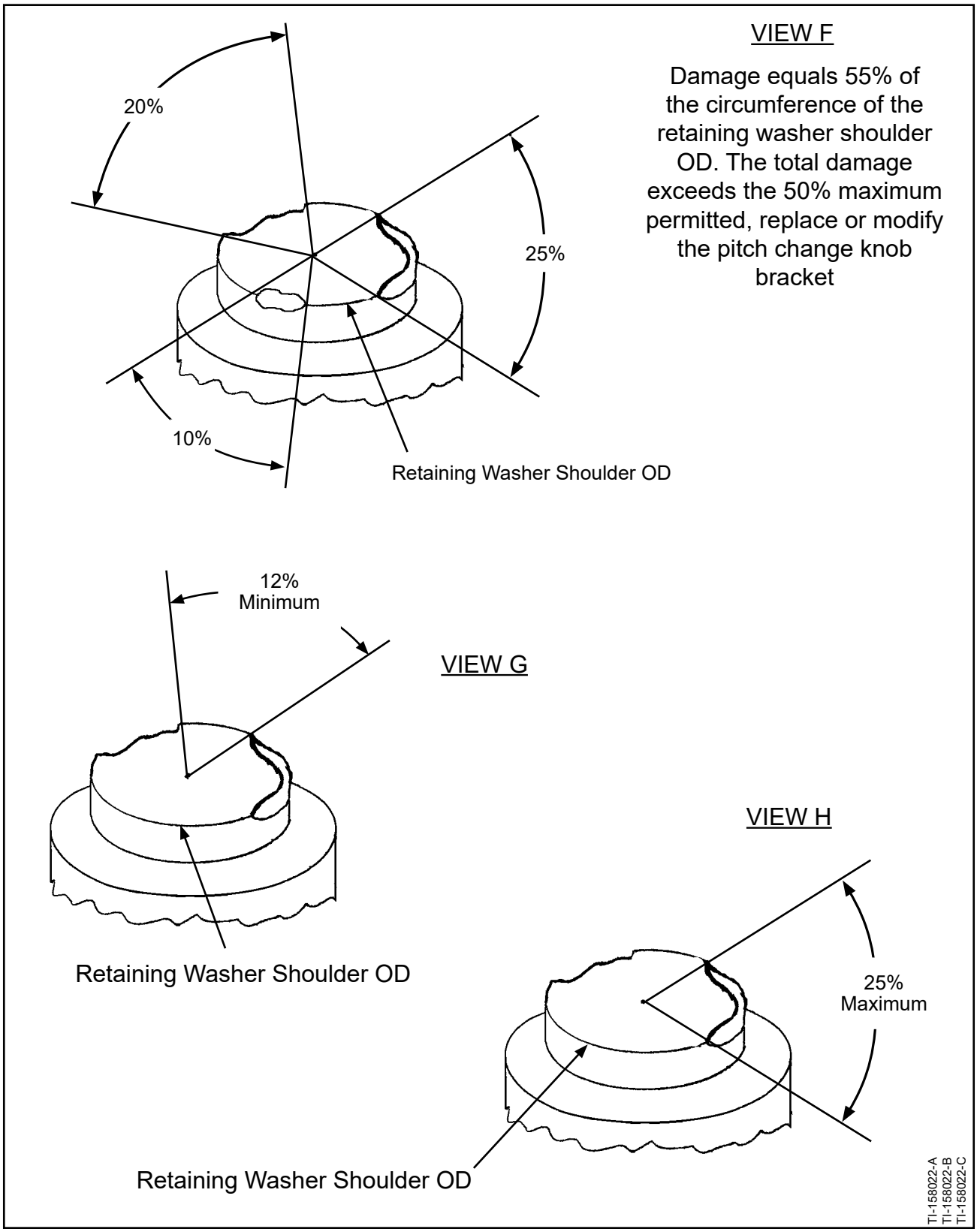
	Inspect	Serviceable Limits	Corrective Action
AI.	YOKE TAPPET (Item 210) Refer to Figure 5-36.		
(1)	Visually examine the width of the pin portion of the yoke tappet for wear. If there is wear, measure the width and the radius of all corners adjacent to the wear.	The minimum permitted width is 0.450 inch (11.43 mm). The minimum permitted radius is 0.060 inch (1.52 mm). The maximum permitted surface finish in an area that has wear is 125 microfinish.	Remove material to establish the 0.060 inch (1.52 mm) radius while maintaining the minimum width of 0.450 inch (11.43 mm). The maximum permitted surface finish in any reworked area is 125 microfinish. If wear is greater than the permitted serviceable limits, replace yoke tappet.
(2)	Visually examine the height of the pin portion of the yoke tappet for wear.	Wear is not permitted.	If there is wear, replace the yoke tappet.
(3)	Visually examine the yoke tappet for anodize coverage.	A few scratches and corners with anodize coating missing are permitted; otherwise, complete coverage is required.	Anodize the yoke tappet in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(4)	Visually examine the threads of the two threaded holes for damage.	One thread total accumulated damage is permitted per hole.	If damage is greater than the permitted serviceable limits, replace the yoke tappet.



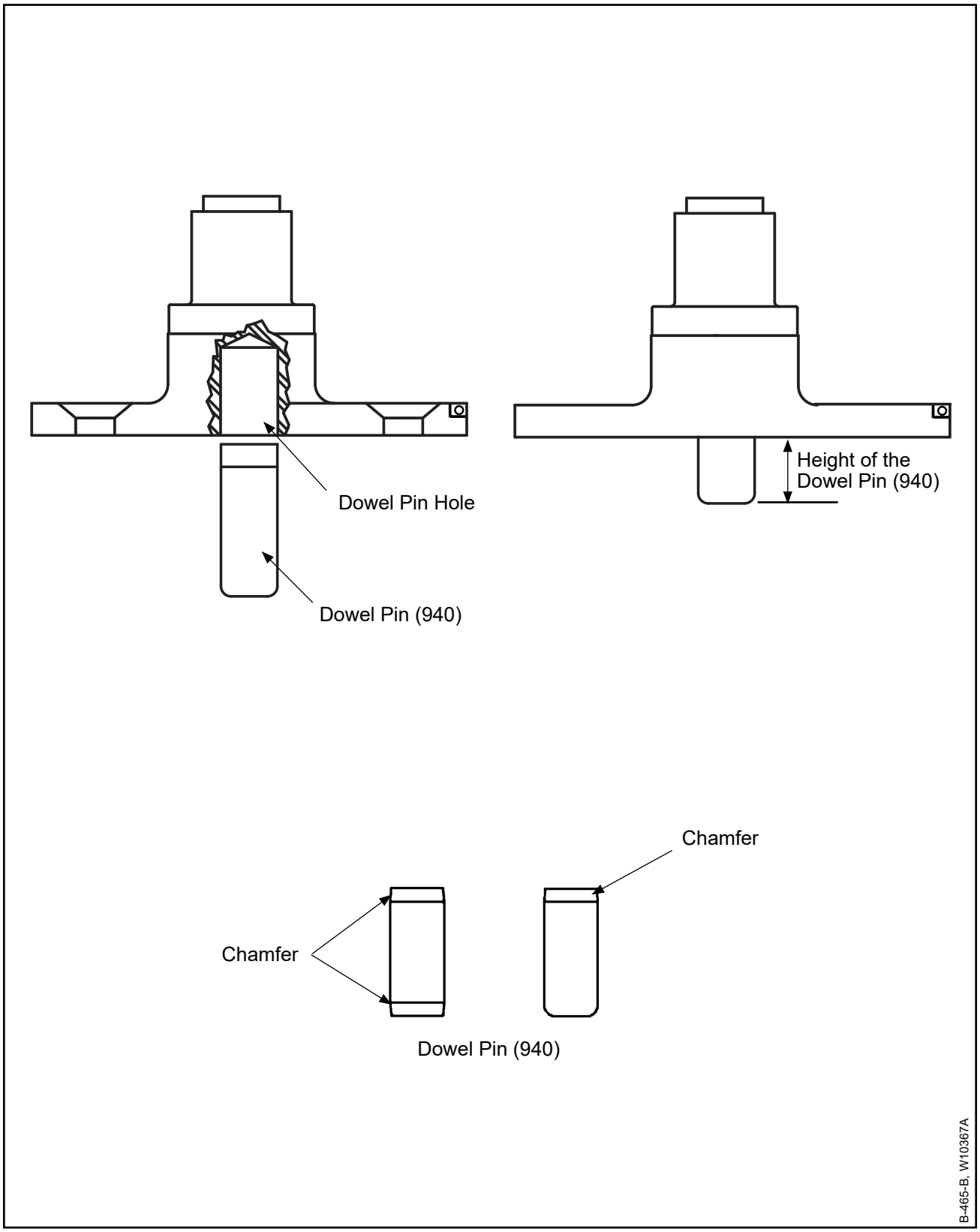
Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-37



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-38



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-39



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-40

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AJ. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER (Item 950) Refer to Figure 5-37 through Figure 5-40.		
(1) Before inspection, remove cadmium plating in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
(2) If dowel pin removal is not required, apply masking material to protect the dowel pin from stripping materials. Dowel pin extension from the pitch change knob bracket base must meet the permitted Serviceable Limits for this part given in this section.		
(3) An example of correct swaging is shown in Figure 5-38, View B. An example of incorrect swaging is shown in Figure 5-38, View C.		
(4) A pitch change knob bracket that does not meet the Serviceable Limits specified in step (5), (6), (7), (8), or (9) in this component inspection criteria may be modified in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.		
(5) Using white light and a 10X magnifying glass, visually examine each swage mark on the washer shoulder of the pitch change knob bracket for cracks.	A crack is not permitted. Refer to Figure 5-38, View D.	A crack may be removed by spot polishing using an emery cloth or abrasive pad CM47. Crack removal must not interfere with the retaining washer face surface or be greater than 25% of the retaining washer shoulder OD in one location. Refer to Figure 5-37 and Figure 5-39, View H. Total accumulated damage or repair must not be greater than 50% of the circumference of the retaining washer shoulder OD. Refer to Figure 5-39, View F. If the damage or repair is greater than the limits given, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section, "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AJ.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
	(6) Visually examine each swage mark on the retaining washer shoulder OD and the retaining washer interface surface for material protrusion. Refer to Figure 5-38, View E.	Material protrusion is not permitted above the retaining washer interface surface.	If there is material protrusion, using an emery cloth remove the material protrusion to flush or below the surface of the retaining washer interface surface or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section, "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
	(7) Visually examine the retaining washer shoulder OD for two undamaged swaging sites to secure the retention washer. Refer to Figure 5-39, View G.	Two unswaged areas that are a minimum width of 12% or 0.188 inch (4.78 mm) of the circumference positioned 120 to 180 degrees apart from each other are required.	If the available swaging sites are not within the permitted serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section, "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
	(8) Measure the OD of the unplated retaining washer interface surface. Refer to Figure 5-37.	The minimum permitted OD of the unplated the retaining washer interface surface is 0.5005 inch (12.713 mm).	If the OD of the unplated retaining washer interface surface is less than the serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section, "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AJ.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
(9)	Visually examine the retaining washer interface surface for damage, corrosion product, or pitting. Refer to Figure 5-37.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. A sharp edge, material protrusion, or raised material from scratches or swaging are not permitted. Corrosion product or pitting is not permitted.	Using an emery cloth or abrasive pad CM47, lightly polish to remove a sharp edge, material protrusion, or raised material and blend into machined surfaces. If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
(10)	Visually examine the bearing interface surface for damage, corrosion product, or pitting. Refer to Figure 5-37.	Bearing roller impressions of any depth are not permitted. Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp edges or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(11)	Measure the OD of the unplated bearing interface surface. Refer to Figure 5-37.	The minimum permitted OD of the unplated bearing interface surface is 0.653 inch (16.59 mm).	If the OD of the unplated bearing interface surface is less than the serviceable limits, replace the pitch change knob bracket

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AJ.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
	(12) Visually examine the cam follower seal surface for scratches, corrosion product, or pitting. Refer to Figure 5-37.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the scratches, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
	(13) Measure the OD of the cam follower seal surface. Refer to Figure 5-37.	The minimum permitted unplated OD of the cam follower seal surface is 0.948 inch (24.90 mm).	If the OD of the cam follower seal surface is less than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AJ. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
(14) Visually examine the pitch change knob bracket for corrosion product and pitting. NOTE: This inspection and repair does not include the bearing interface surface, the cam follower seal surface, or the retaining washer interface surface.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the pitch change knob bracket has pitting, measure the depth, diameter, and area of pitting. The maximum permitted depth of pitting is 0.003 inch (0.07 mm). The maximum permitted total area of pitting is 0.500 square inch (322 square mm) area. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within 1 square inch (645 square mm) area are permitted. Linear pitting is not permitted.	Do not glass bead clean the bearing interface surface, the cam follower seal surface, or the retaining washer interface surface. For all surfaces of the pitch change knob bracket other than those listed above, remove corrosion product using glass bead cleaning or local polishing using emery cloth. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the pitch change knob bracket. The maximum permitted depth for repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 square inch (645 square mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If pitting or repair is greater than the permitted serviceable limits or Corrective Action repair limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AJ. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
(15) Visually examine the pitch change knob bracket for nicks, scratches, or other damage. NOTE: This inspection and repair does not include the bearing interface surface, the retaining washer interface surface, or the cam follower seal surface.	If the pitch change knob bracket is damaged, measure the depth, and area of nicks, scratches, or other damage. The maximum permitted depth of nicks, scratches, or other damage is 0.003 inch (0.07 mm). The maximum permitted total area of nicks, scratches, or other damage is 0.500 square inch (322 square mm) area. Raised material or edges of pushed up material on the surfaces that interface with other components are not permitted.	The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 square inch (645 square mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If the nicks, scratches, other damage, or repair is greater than the permitted serviceable or Corrective Action repair limits, replace the pitch change knob bracket.
(16) Examine the dowel pin for movement in the pitch change knob bracket.	Using firm hand pressure, try to move the dowel pin. Movement is not permitted.	If there is movement of the dowel pin, replace the dowel pin.
(17) Measure the height of the dowel pin from the pitch change knob bracket base. Refer to Figure 5-40.	The maximum permitted height is 0.440 inch (11.17 mm). The minimum permitted height is 0.390 inch (9.91 mm).	If the height of the dowel pin is greater than the permitted height, press the pin into the bracket to the correct height. If height of the dowel pin is less than the permitted serviceable limits, replace the pin. The replacement pin must fit tightly.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AJ.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-37 through Figure 5-40.		
(18)	Visually examine the OD of the exposed portion of the dowel pin for damage or corrosion product.	Damage or corrosion product is not permitted.	If there is damage or corrosion product, replace the dowel pin.
(19)	If the dowel pin is removed, visually examine the dowel pin hole for corrosion product or pitting. Refer to Figure 5-40.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the pitch change knob bracket.
(20)	Visually examine the two safety wire holes, if applicable, for damage.	The safety wire hole must be able to secure the safety wire.	If the damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(21)	Magnetic particle inspect the pitch change knob bracket in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the dowel pin.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change knob bracket.
(22)	If removal of the dowel pin is not required, apply masking material to protect the dowel pin from cadmium plating materials.		
(23)	If the pitch change knob has successfully passed all inspections, apply masking material to the Bearing Interface Surface, reapply cadmium plating, and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		

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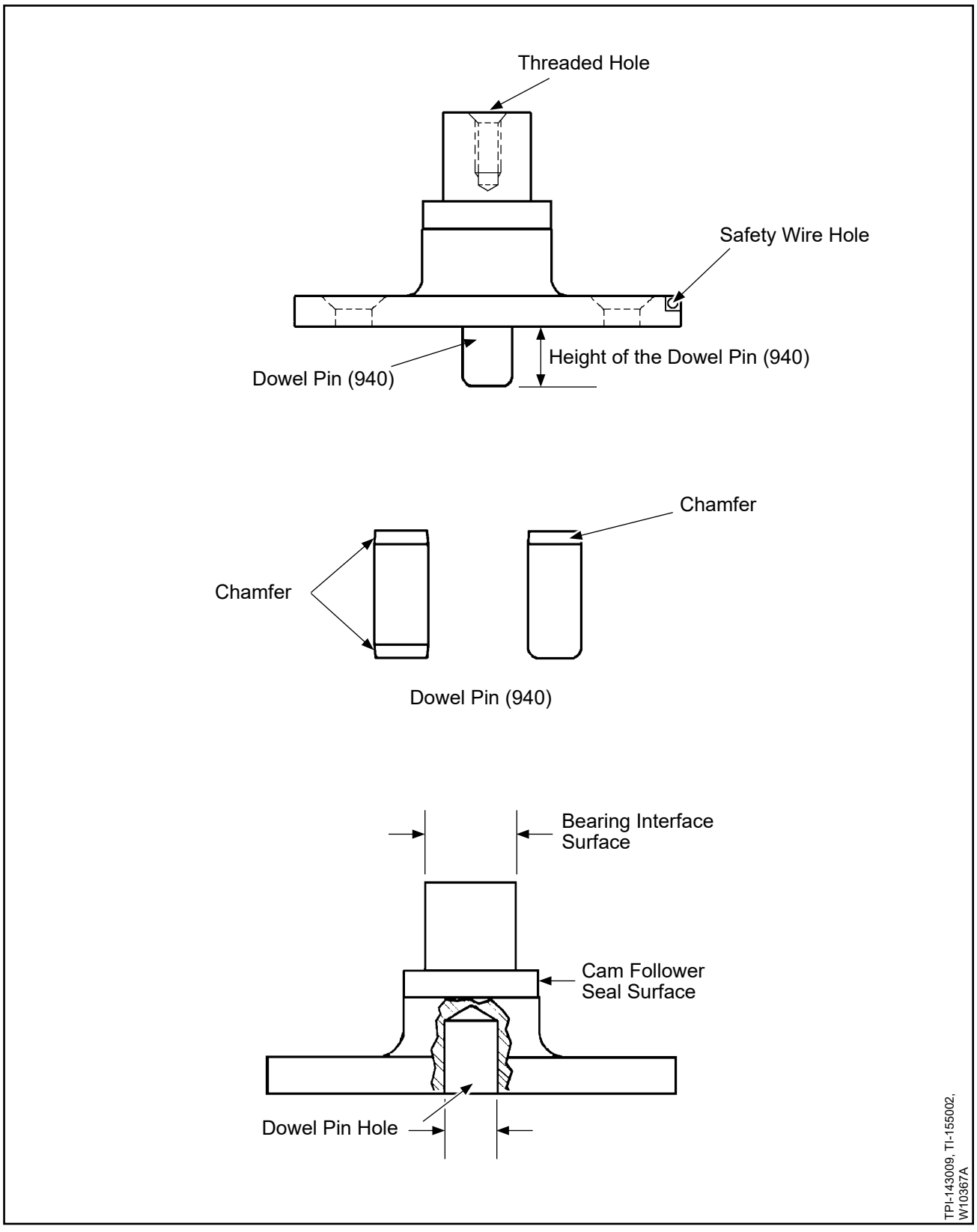


Pitch Change Knob Bracket that Uses a Screw to Retain the Cam Follower
Figure 5-41

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AK.	PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER (Item 950) Refer to Figure 5-41.		
	(1) Before inspection, remove cadmium plating in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
	(2) If dowel pin removal is not required, apply masking material to protect the dowel pin from stripping materials. Dowel pin extension from the pitch change knob bracket base must meet the permitted Serviceable Limits for the dowel pin specified in this section.		
	(3) Visually examine the bearing interface surface for damage, corrosion product, or pitting.	Bearing roller impressions of any depth are not permitted. Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp edges or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
	(4) Measure the OD of the unplated bearing interface surface.	The minimum permitted OD of the unplated bearing interface surface is 0.653 inch (16.59 mm).	If the OD of the unplated bearing interface surface is less than the serviceable limits, replace the pitch change knob bracket
	(5) Visually examine the cam follower seal surface for scratches, corrosion product, or pitting.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the scratches, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
	(6) Measure the OD of the cam follower seal surface.	The minimum permitted unplated OD of the cam follower seal surface is 0.948 inch (24.08 mm).	If the OD of the cam follower seal surface is less than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AK. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-41.		
(7) Visually examine the pitch change knob bracket for corrosion product and pitting. NOTE: This inspection and repair does not include the bearing interface surface, the cam follower seal surface, or the threaded hole.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the pitch change knob bracket has pitting, measure the depth, diameter, and area of pitting. The maximum permitted depth of pitting is 0.003 inch (0.07 mm). The maximum permitted total area of pitting is 0.500 square inch (322 square mm) area. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within 1 square inch (645 square mm) area are permitted. Linear pitting is not permitted.	Do not glass bead clean the bearing interface surface, the cam follower seal surface, or the threaded hole. For all surfaces of the pitch change knob bracket other than those listed above, remove corrosion product using glass bead cleaning or local polishing using emery cloth. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the pitch change knob bracket. The maximum permitted depth for repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 square inch (645 square mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If pitting or repair is greater than the permitted serviceable limits or Corrective Action repair limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AK. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-41.		
(8) Visually examine the pitch change knob bracket for nicks, scratches, or other damage. NOTE: This inspection and repair does not include the bearing interface surface, the threaded hole, or the cam follower seal surface.	If the pitch change knob bracket is damaged, measure the depth, diameter, and area of pitting. The maximum permitted depth of nicks, scratches, or other damage is 0.003 inch (0.07 mm). The maximum permitted total area of nicks, scratches, or other damage is 0.500 square inch (322 square mm) area. Raised material or edges of pushed up material on the surfaces that interface with other components are not permitted.	The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 square inch (645 square mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If the nicks, scratches, other damage, or repair is greater than the permitted serviceable or Corrective Action repair limits, replace the pitch change knob bracket.
(9) Examine the dowel pin for movement in the pitch change knob bracket.	Using firm hand pressure, try to move the dowel pin. Movement is not permitted.	If there is movement of the dowel pin, replace the dowel pin.
(10) Measure the height of the dowel pin from the pitch change knob bracket base.	The maximum permitted height is 0.440 inch (11.17 mm). The minimum permitted height is 0.390 inch (9.91 mm).	If the height of the dowel pin is greater than the permitted height, press the pin into the bracket to the correct height. If height of the dowel pin is less than the permitted serviceable limits, replace the pin. The replacement pin must fit tightly.

Component Inspection Criteria
Table 5-1

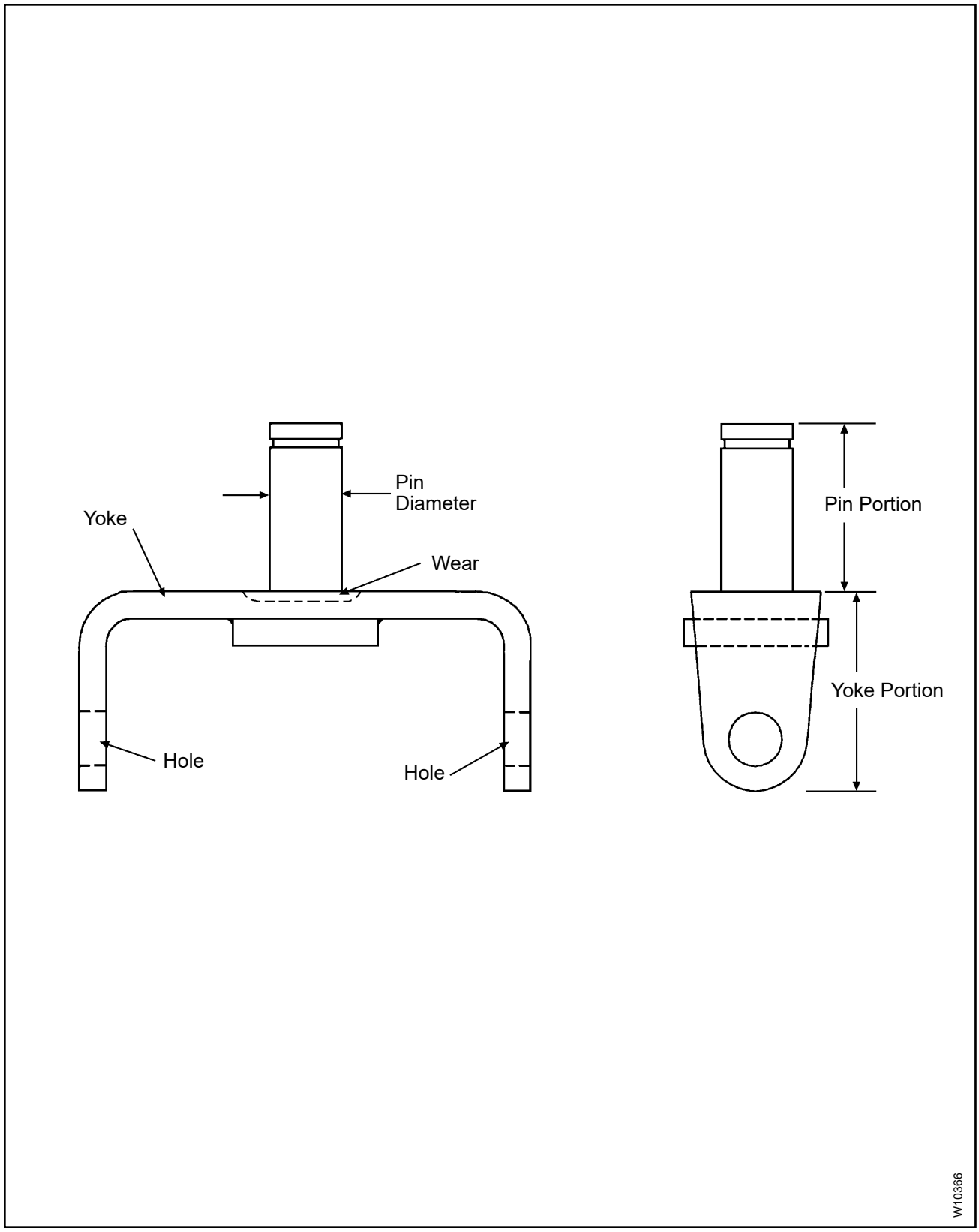
Inspect	Serviceable Limits	Corrective Action
AK. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-41.		
(11) Visually examine the OD of the exposed portion of the dowel pin for damage or corrosion product.	Damage or corrosion product is not permitted.	If there is damage or corrosion product, replace the dowel pin.
(12) If the dowel pin is removed, visually examine the dowel pin hole for corrosion product or pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the pitch change knob bracket.
(13) Visually examine the pitch change knob bracket threaded hole for corrosion product or damage.	Corrosion product is not permitted. A maximum of 3/4 if one thread total accumulated damage is permitted.	If corrosion product or damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(14) Visually examine the two safety wire holes, if applicable, for damage.	The safety wire hole must be able to secure the safety wire.	If the damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(15) Magnetic particle inspect the pitch change knob bracket in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the dowel pin.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AK. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 950) Refer to Figure 5-41.		

(16) If removal of the dowel pin is not required, apply masking material to protect the dowel pin from cadmium plating materials.

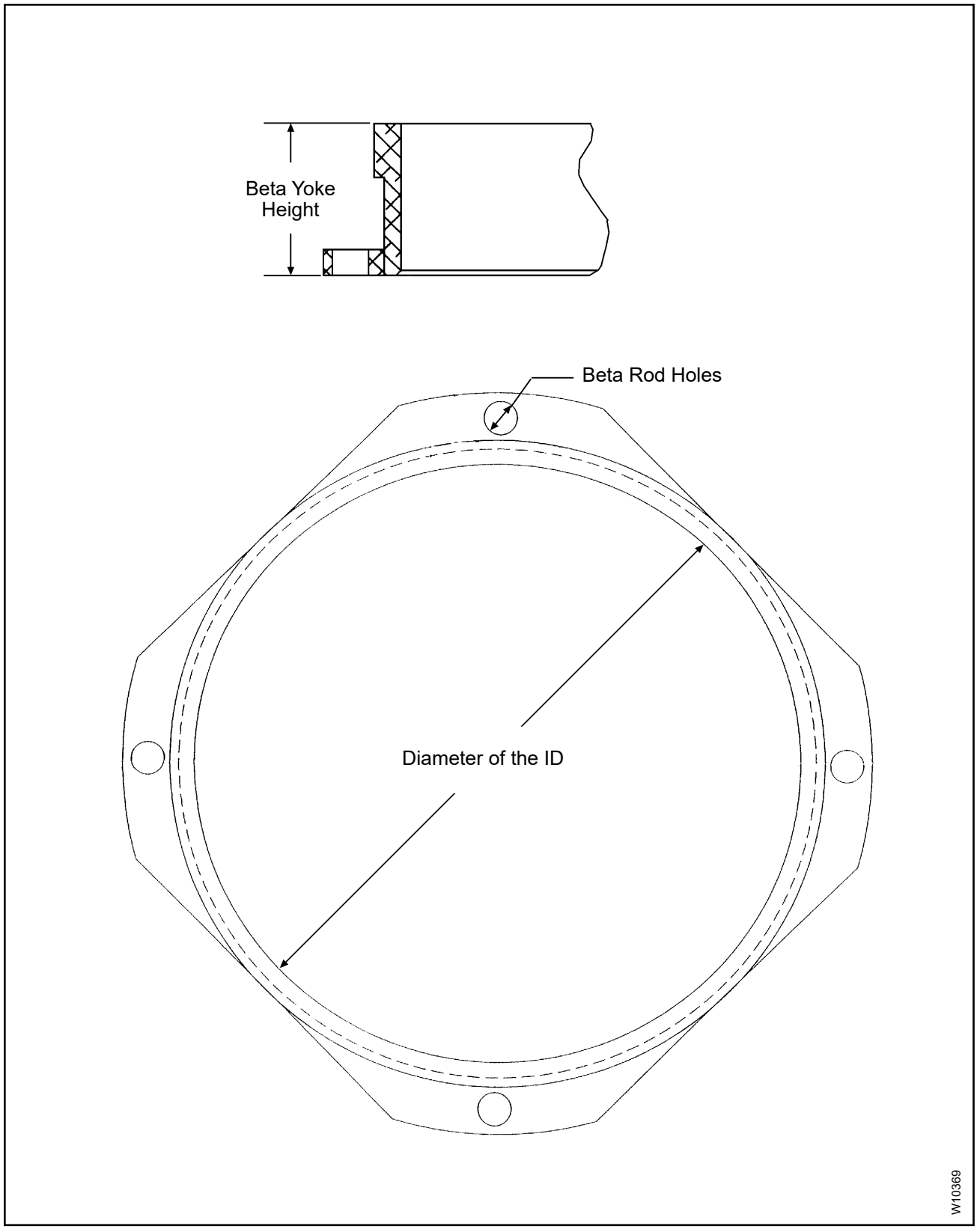
(17) If the pitch change knob has successfully passed all inspections, apply masking material to the Bearing Interface Surface, reapply cadmium plating, and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Yoke Unit
Figure 5-42

Component Inspection Criteria
Table 5-1

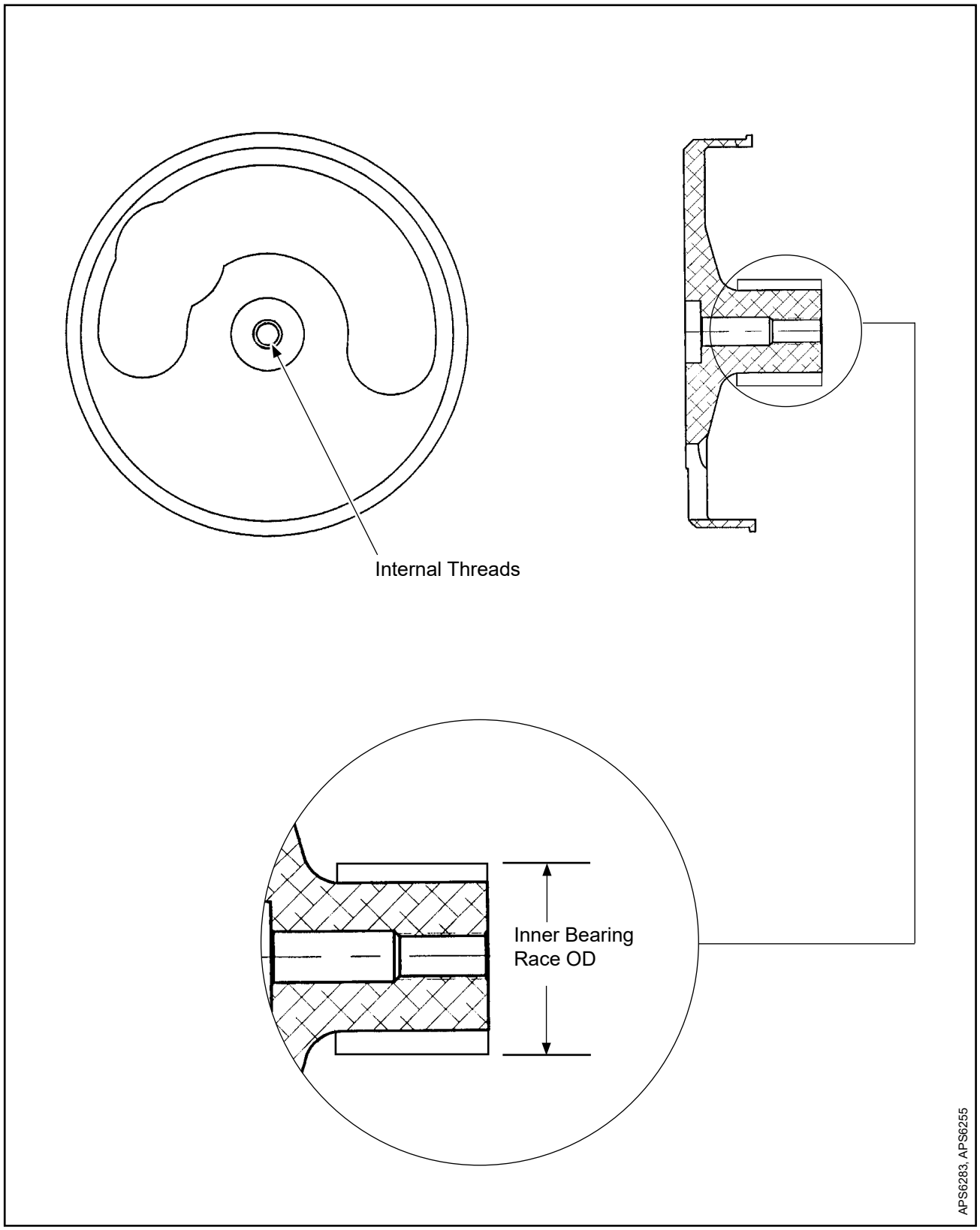
	Inspect	Serviceable Limits	Corrective Action
AL.	YOKE UNIT (Item 880) Refer to Figure 5-42.		
(1)	Visually examine the yoke unit for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm) in the yoke portion only. Pitting is not permitted in the pin portion.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the yoke unit. If the damage is greater than the permitted serviceable limits, replace the yoke unit.
(2)	Visually examine the yoke unit for damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm) in the yoke portion only. Light scratches are permitted in the pin portion. Damage must not interfere with the mating part.	Using an abrasive pad CM47 or equivalent, polish to remove raised material that is above the normal diameter of the pin. If the damage is greater than the permitted serviceable limits, replace the yoke unit.
(3)	Measure the pin diameter.	The minimum permitted diameter is 0.2475 inch (6.287 mm)	If the diameter is less than the permitted serviceable limits, replace the yoke unit.
(4)	Measure the two holes in the yoke part.	The maximum permitted diameter is 0.1895 inch (4.813 mm).	If the diameter is greater than the permitted serviceable limits, replace the yoke unit.
(5)	Visually examine for wear to the yoke portion where the pin and yoke meet.	The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the depth of wear is greater than the serviceable limits, replace the yoke unit.
(6)	Visually examine the yoke unit for cadmium plating coverage.	A few scratches and corners with cadmium plate missing is permitted; otherwise, complete coverage is required.	Cadmium replate the yoke unit in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Beta Yoke
Figure 5-43

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AM.	BETA YOKE (Item 20) Refer to Figure 5-43.		
(1)	Visually examine the beta yoke for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the beta yoke.
(2)	Visually examine the beta yoke for damage and pitting.	Damage or pitting that is 0.007 inch (0.18 mm) deep or less must be removed. Damage or pitting deeper than 0.007 inch (0.18 mm) is not permitted.	Using an abrasive pad CM47 or equivalent, polish damage or pitting up to 0.007 inch (0.17 mm) deep. If damage is greater than the permitted serviceable limits, replace the beta yoke.
(3)	Visually examine the ID surface of the beta yoke for wear. If worn, measure the ID.	The maximum permitted diameter is 6.286 inches (159.66 mm).	If the ID is greater than the permitted serviceable limits, replace the beta yoke.
(4)	Visually examine the four (4) beta rod holes of the beta yoke for wear. If worn, measure the hole diameter.	The maximum permitted diameter is 0.355 inch (9.01 mm).	If the ID is greater than the permitted serviceable limits, replace the beta yoke.
(5)	Visually examine the beta yoke height for wear or damage. If worn, measure the height.	The minimum permitted height is 1.416 inches (35.97 mm).	If the height is less than the permitted serviceable limits, replace the beta yoke.
(6)	Visually examine the beta yoke for anodize coverage.	A few random scratches and corners with anodize coating missing is permitted; otherwise, complete coverage is required.	Anodize the beta yoke in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Preload Plate Assembly with Inner Bearing Race
Figure 5-44

Component Inspection Criteria
Table 5-1

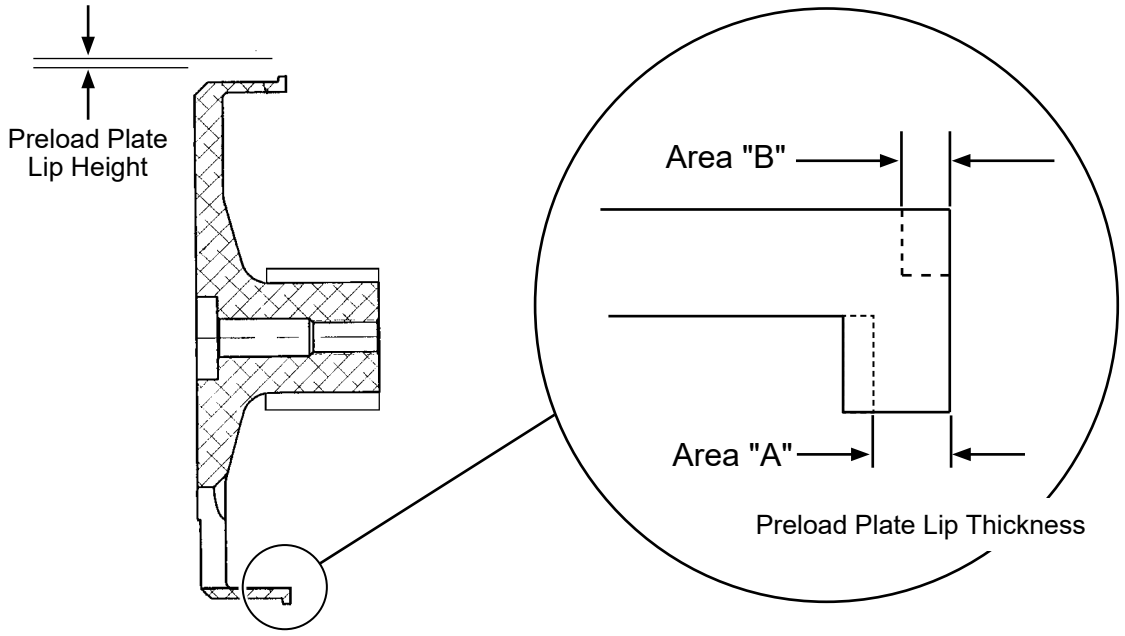
	Inspect	Serviceable Limits	Corrective Action
AN.	PRELOAD PLATE ASSEMBLY w/INNER BEARING RACE (Item 980) Refer to Figure 5-44 and Figure 5-45.		
(1)	Visually examine the aluminum part of the preload plate assembly for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the preload plate assembly.
(2)	Visually examine the aluminum part of the preload plate assembly for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Pitting may be removed by polishing using an abrasive pad CM47 or equivalent, up to 0.007 inch (0.17 mm) deep. If the depth of pitting or polishing is greater than the permitted serviceable limits, replace the preload plate assembly.
(3)	Visually examine the internal threads for damage.	A maximum of two threads of total accumulated damage are permitted.	If the damage is greater than the permitted serviceable limits, replace the preload plate assembly.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AN.	PRELOAD PLATE ASSEMBLY w/INNER BEARING RACE, CONTINUED (Item 980) Refer to Figure 5-44 and Figure 5-45.		
	(4) Visually examine the OD of the inner bearing race (1000) for corrosion product, brinelling, pitting, and damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Raised material is not permitted. The maximum permitted depth of brinelling is 0.003 inch (0.07 mm). The maximum permitted depth of pitting and damage is 0.005 inch (0.12 mm). The maximum permitted total area of brinelling, pitting, and damage is 5%.	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Polish raised material using abrasive pad CM47 or equivalent. **B-6679 inner bearing race:** If corrosion product cannot be removed, or if raised material, brinelling, pitting, or damage of the inner bearing race is greater than the permitted serviceable limits, remove the inner bearing race in accordance with the Repair chapter of this manual, then examine the preload plate spindle in accordance with the applicable step in this Preload Plate Assembly inspection criteria. **A-1272 inner bearing race:** If corrosion product cannot be removed, or if raised material, brinelling, pitting, or damage of the inner bearing race is greater than the permitted serviceable limits, replace the preload plate assembly.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AN. PRELOAD PLATE ASSEMBLY w/INNER BEARING RACE, CONTINUED (Item 980) Refer to Figure 5-44 and Figure 5-45.		
(5) Measure the OD of the inner bearing race (1000).	**B-6679 inner bearing race:** The minimum permitted OD is 1.249 inch (31.73 mm). **A-1272 inner bearing race:** The minimum permitted OD is 1.124 inch (28.55 mm).	**B-6679 inner bearing race:** If the OD is less than the permitted serviceable limits, remove the inner bearing race in accordance with the Repair chapter of this manual, then examine the preload plate spindle in accordance with the applicable step in this Preload Plate Assembly inspection criteria. **A-1272 inner bearing race:** If the OD is less than the permitted serviceable limits, replace the preload plate assembly.
(6) If the inner bearing race (1000) is removed, visually examine the preload plate spindle for corrosion product, raised material, and damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Raised material is not permitted. The maximum permitted depth of damage is 0.004 inch (0.10 mm).	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Polish raised material using abrasive pad CM47 or equivalent. If corrosion product cannot be removed, or if raised material or damage to the preload plate spindle is greater than the permitted serviceable limits, replace the preload plate assembly.



Lip Thickness in Area "A"	Maximum Permitted Depth of Damage in Area "B"
0.060 inch (1.53 mm)	0.013 inch (0.33 mm) or less
0.061 inch (1.55 mm)	0.014 inch (0.35 mm)
0.062 inch (1.58 mm)	0.015 inch (0.38 mm)
0.063 inch (1.61 mm)	0.016 inch (0.40 mm)
0.064 inch (1.63 mm)	0.017 inch (0.43 mm)
0.065 inch (1.66 mm)	0.018 inch (0.45 mm)
0.066 inch (1.68 mm)	0.019 inch (0.48 mm)
0.067 inch (1.71 mm) or greater	0.020 inch (0.50 mm)

Example 1: Lip thickness in Area "A" is greater than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.016 inch (0.40 mm).
Preload plate is within permitted serviceable limits.

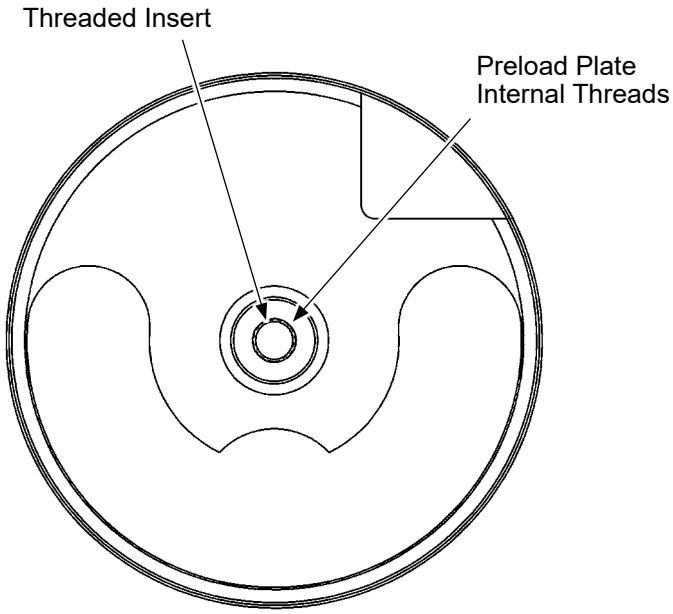
Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.018 inch (0.45 mm).
Damage is greater than the permitted serviceable limits,
replace the preload plate.

APS6283, APS6284

Preload Plate Lip Measurement
Figure 5-45

Component Inspection Criteria
Table 5-1

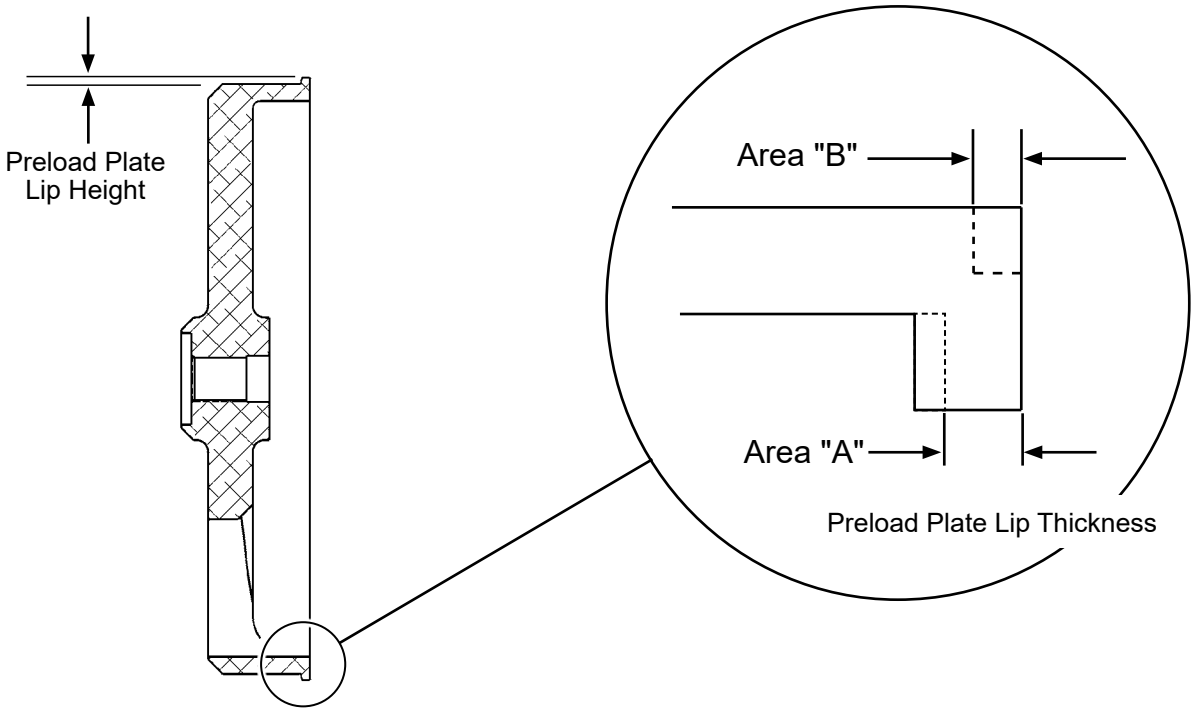
Inspect	Serviceable Limits	Corrective Action
AN. PRELOAD PLATE ASSEMBLY w/INNER BEARING RACE, CONTINUED (Item 980) Refer to Figure 5-44 and Figure 5-45.		
(7) Visually examine the preload plate lip for damage. If the lip is damaged, measure the lip height.	The minimum permitted lip height is 0.040 inch (1.02 mm).	Remove any rough edges or evidence of fretting. If damage or repair is greater than the permitted serviceable limits, or the lip height is less than the permitted serviceable limits, replace the preload plate assembly.
(8) Visually examine the preload plate lip for damage. If the lip is damaged, measure the lip thickness.	The minimum lip thickness in Area "A" is 0.060 inch (1.53 mm). The maximum permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the minimum thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-42 to find the maximum permitted depth of damage in Area "B" when lip thickness in Area "A" is equal to or greater than the dimension specified in Figure 5-45.	If the lip thickness in Area "A" is less than the permitted serviceable limits, replace the preload plate. If the depth of damage in Area "B" is greater than the permitted serviceable limits, replace the preload plate assembly.
(9) Penetrant inspect the preload plate in accordance with the Penetrant Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted	If there is a relevant indication, replace the preload plate assembly.



Preload Plate Assembly with Threaded Insert
Figure 5-46

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AO.	PRELOAD PLATE ASSEMBLY with THREADED INSERT (Item 990) Refer to Figure 5-46 and Figure 5-47.		
(1)	Visually examine the preload plate for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Mask the threads. Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the preload plate.
(2)	Visually examine the preload plate for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Using an abrasive pad CM47 or equivalent, pitting may be removed by polishing up to 0.007 inch (0.17 mm) deep. If the pitting or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the preload plate.
(3)	Visually examine the threaded insert for thread damage.	Thread damage is not permitted.	If the damage is greater than the permitted serviceable limits, replace the threaded insert in accordance with the section "Replacement of a Preload Plate Threaded Insert" in the Repair chapter of this manual.
(4)	If the threaded insert has been removed, visually examine the preload plate threads for damage.	A maximum 1/4 of one thread of total accumulated damage is permitted. Damage must not interfere with the threaded insert.	If the damage is greater than the permitted serviceable limits, replace the preload plate.



Lip Thickness in Area "A"	Maximum Permitted Depth of Damage in Area "B"
0.060 inch (1.53 mm)	0.013 inch (0.33 mm) or less
0.061 inch (1.55 mm)	0.014 inch (0.35 mm)
0.062 inch (1.58 mm)	0.015 inch (0.38 mm)
0.063 inch (1.61 mm)	0.016 inch (0.40 mm)
0.064 inch (1.63 mm)	0.017 inch (0.43 mm)
0.065 inch (1.66 mm)	0.018 inch (0.45 mm)
0.066 inch (1.68 mm)	0.019 inch (0.48 mm)
0.067 inch (1.71 mm) or greater	0.020 inch (0.50 mm)

Example 1: Lip thickness in Area "A" is greater than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.016 inch (0.40 mm).
Preload plate is within permitted serviceable limits

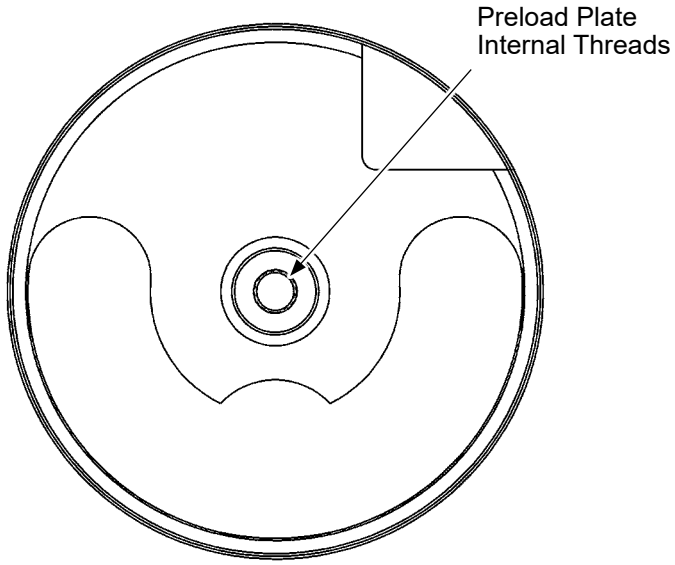
Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.018 inch (0.45 mm)
Damage is greater than permitted serviceable limits,
replace the preload plate.

APS6283, APS6284

Preload Plate Lip Measurement
Figure 5-47

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AO.	PRELOAD PLATE ASSEMBLY with THREADED INSERT, CONTINUED (Item 990) Refer to Figure 5-46 and Figure 5-47.		
	(5) Visually examine the lip of the preload plate for damage. If the lip is damaged, measure the lip height.	The minimum permitted lip height is 0.040 inch (1.02 mm).	If the lip height is less than the permitted serviceable limits, replace the preload plate.
	(6) Visually examine the preload plate lip for damage. If the lip is damaged, measure the lip thickness.	The minimum lip thickness in Area "A" is 0.060 inch (1.53 mm). The maximum permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-47 to find the maximum permitted depth of damage in Area "B" when lip thickness in Area "A" is equal to or greater than the dimension specified in Figure 5-47.	If the lip thickness in Area "A" is less than the permitted serviceable limits, replace the preload plate. If the depth of damage in Area "B" is greater than the permitted serviceable limits, replace the preload plate assembly.
	(7) Penetrant inspect the preload plate in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: The threaded insert does not need to be removed for this inspection. Pre-penetrant etch is not required if the threaded insert is not removed.	A relevant indication is not permitted	If there is a relevant indication, replace the preload plate assembly.

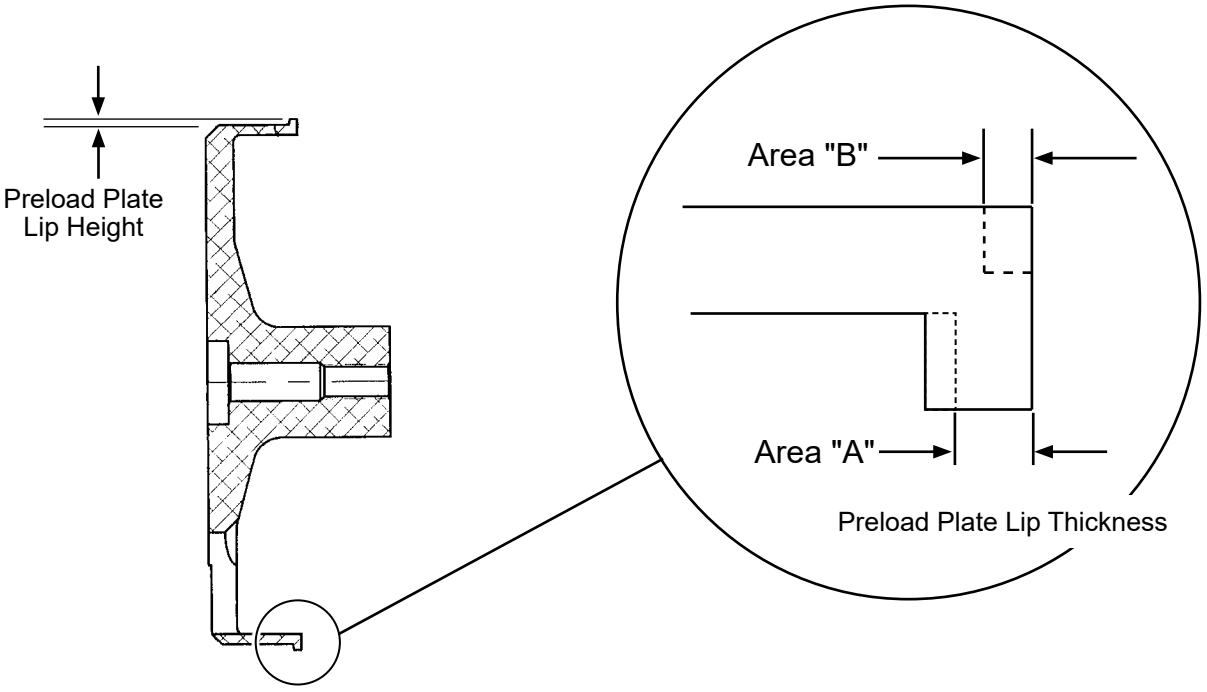


TI-158-61

Preload Plate Assembly (p/n 100641-1)
Figure 5-48

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AP.	PRELOAD PLATE ASSEMBLY p/n 100641-1 ONLY (Item 990) Refer to Figure 5-48 and Figure 5-49.		
	(1) Visually examine the preload plate for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Mask the threads. Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).If the corrosion product cannot be removed, replace the preload plate.
	(2) Visually examine the preload plate for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Using an abrasive pad CM47 or equivalent, pitting may be removed by polishing up to 0.007 inch (0.17 mm) deep. If the pitting or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the preload plate.
	(3) Visually examine the internal threads for thread damage.	A maximum of two threads of accumulated damage are permitted.	If the damage is greater than the permitted serviceable limits, replace the preload plate.



Lip Thickness in Area "A"	Maximum Permitted Depth of Damage in Area "B"
0.060 inch (1.53 mm)	0.013 inch (0.33 mm) or less
0.061 inch (1.55 mm)	0.014 inch (0.35 mm)
0.062 inch (1.58 mm)	0.015 inch (0.38 mm)
0.063 inch (1.61 mm)	0.016 inch (0.40 mm)
0.064 inch (1.63 mm)	0.017 inch (0.43 mm)
0.065 inch (1.66 mm)	0.018 inch (0.45 mm)
0.066 inch (1.68 mm)	0.019 inch (0.48 mm)
0.067 inch (1.71 mm) or greater	0.020 inch (0.50 mm)

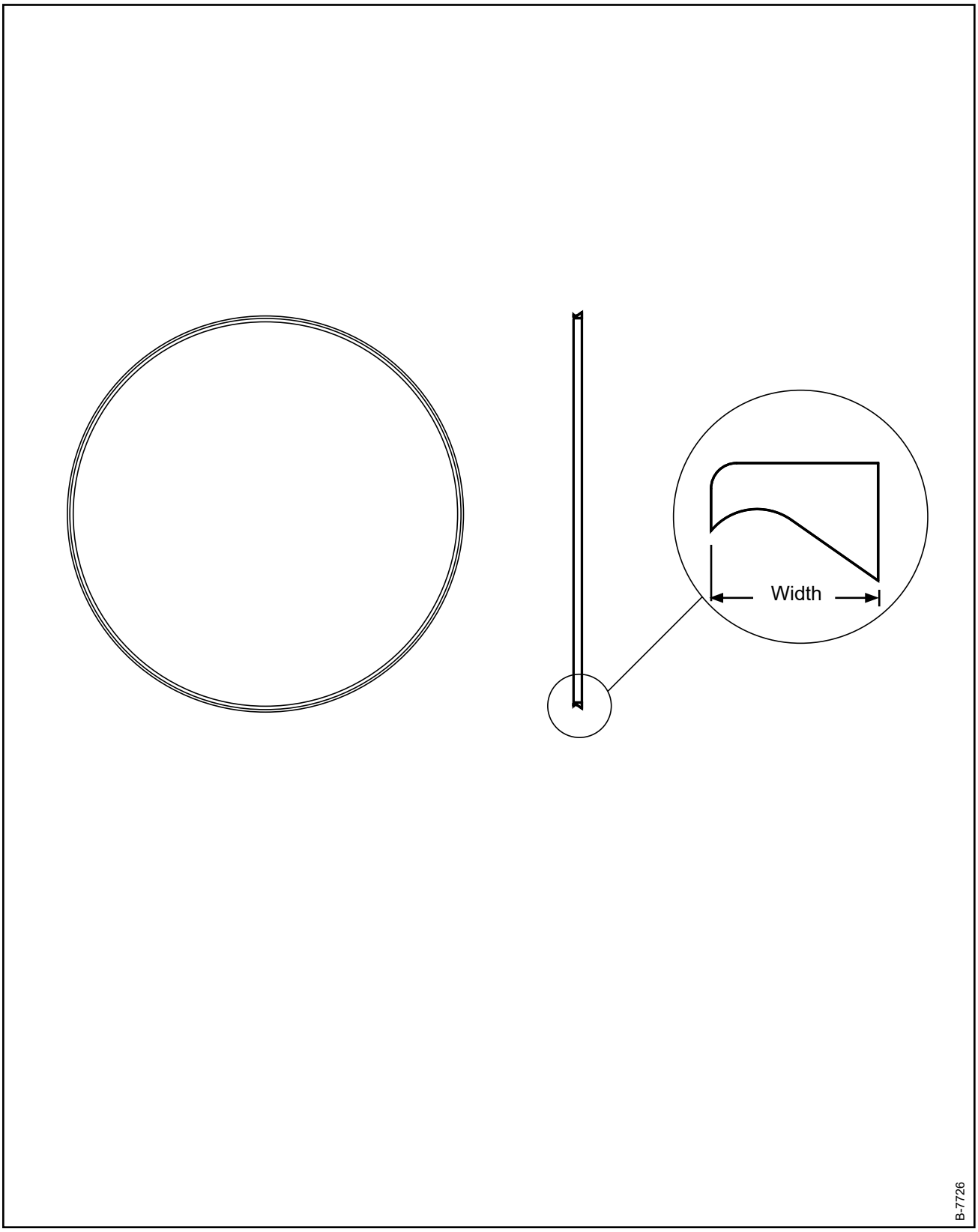
Example 1: Lip thickness in Area "A" is greater than 0.063 inch (1.61 mm) Depth of damage in Area "B" is 0.016 inch (0.40 mm). Preload plate is within permitted serviceable limits.

Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.61 mm) Depth of damage in Area "B" is 0.018 inch (0.45 mm). Damage is greater than the permitted serviceable limits, replace the preload plate.

Preload Plate Lip Measurement
Figure 5-49

Component Inspection Criteria
Table 5-1

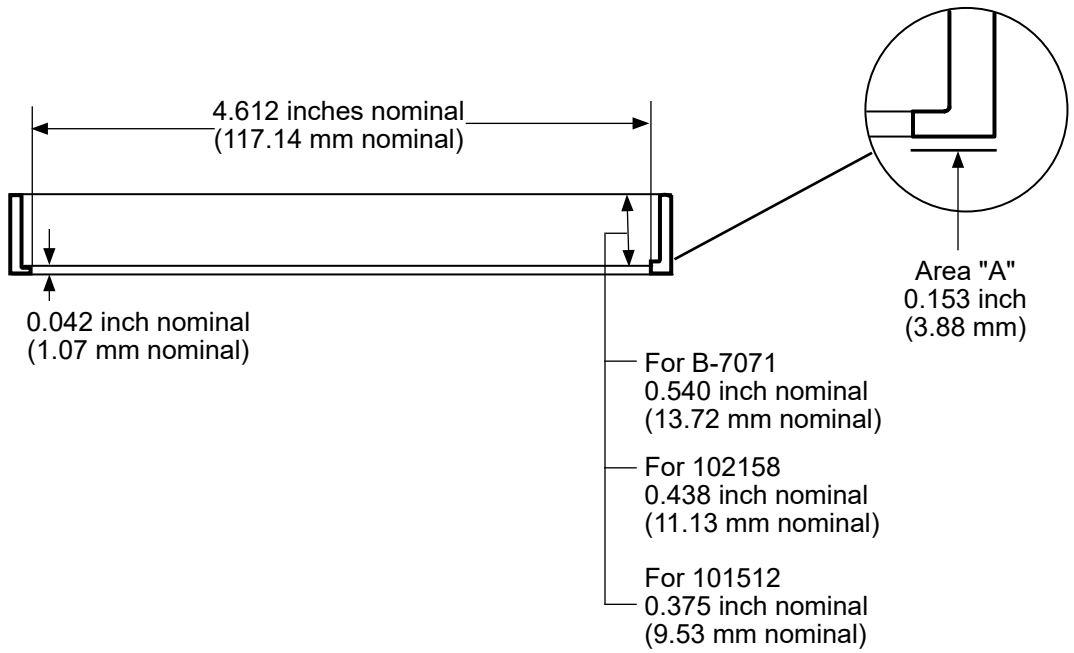
	Inspect		Serviceable Limits	Corrective Action
AP.	PRELOAD PLATE ASSEMBLY p/n 100641-1 ONLY, CONTINUED (Item 990) Refer to Figure 5-48 and Figure 5-49.			
	(5)	Visually examine the lip of the preload plate for damage. If the lip is damaged, measure the lip height.	The minimum permitted lip height is 0.40 inch (1.02 mm).	If the lip height is less than the permitted serviceable limits, replace the preload plate.
	(6)	Visually examine the preload plate lip for damage. If the lip is damaged, measure the lip thickness.	The minimum lip thickness in Area "A" is 0.060 inch (1.53 mm). The maximum permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-49 to find the maximum permitted depth of damage in Area "B" when lip thickness in Area "A" is equal to or greater than the dimension specified in Figure 5-49.	If the lip thickness in Area "A" is less than the permitted serviceable limits, replace the preload plate. If the depth of damage in Area "B" is greater than the permitted serviceable limits, replace the preload plate assembly.
	(7)	Perform penetrant inspection of the preload plate in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the preload plate assembly.



Blade Seal
Figure 5-50

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AQ.	BLADE SEAL (Item 1035) Refer to Figure 5-50.		
	(1) Using 10X magnification and an appropriate light source, visually examine the blade seal for damage, missing material, separation, or form irregularities of the continuous ring.	Damage, missing material, separation, or irregularities are not permitted.	If the damage or other conditions are greater than the permitted serviceable limits, replace the blade seal.
	(2) Visually examine the width of the blade seal for wear. If worn, measure the width of the blade seal.	The minimum permitted width is as follows: B-7726 - 0.090 inch (2.29 mm) 101437 - 0.230 inch (5.84 mm)	If the width is less than the permitted serviceable limits, replace the blade seal.

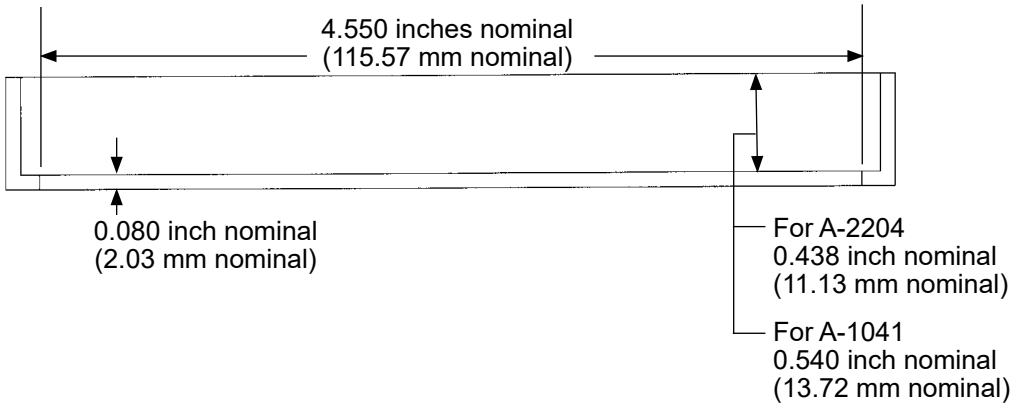


NOTE: Dimensions are for identification purposes only

B-7071, 101512, and 102158 Bearing Retaining Ring
Figure 5-51

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AR.	BEARING RETAINING RING p/n B-7071, 101512, and 102158 (Item 1030) Refer to Figure 5-51.		
(1)	Except for Area "A", visually examine the bearing retaining ring for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting must not interfere with the ability of the bearing retaining ring to fit tightly to the blade and the bearing race.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing retaining ring. If the corrosion product or pitting is greater than the permitted serviceable limits, replace the bearing retaining ring.
(2)	Visually examine the bearing retaining ring for corrosion product, pitting, or wear in Area "A".	Corrosion product, pitting, or wear is not permitted.	If there is corrosion product, pitting, or wear, replace the bearing retaining ring.
(3)	Except for Area "A", visually examine the bearing retaining ring for wear, damage, or fretting.	The bearing retaining ring must fit tightly to the blade and the bearing race when installed over the blade and bearing race.	If the wear, damage, or fretting is greater than the permitted serviceable limits, replace the bearing retaining ring.
(4)	Visually examine the entire bearing retaining ring for cadmium plating coverage.	A few random scratches and corners with cadmium plating missing are permitted; otherwise, complete cadmium plating coverage is required.	If cadmium plating is not on all surfaces, cadmium replate the bearing retaining ring in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



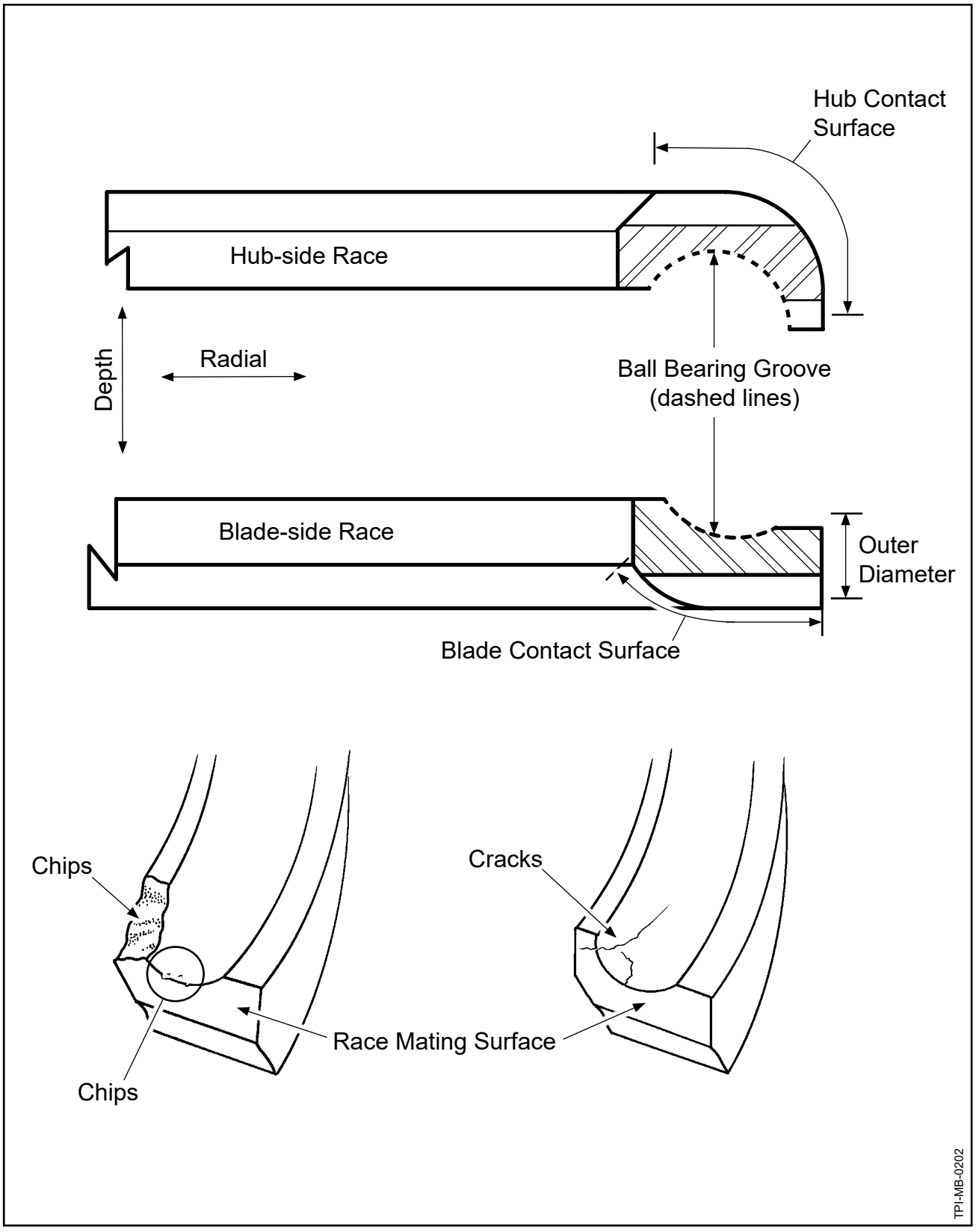
NOTE: Dimensions are for identification purposes only

B-1041

A-2204 and B-1041 Bearing Retaining Ring
Figure 5-52

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AS.	BEARING RETAINING RING p/n A-2204 and B-1041 (Item 1030) Refer to Figure 5-52.		
	(1) Visually examine the bearing retaining ring for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting must not interfere with the ability of the bearing retaining ring to fit tight to the blade and the bearing race.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing retaining ring. If damage is greater than the permitted serviceable limits, replace the bearing retaining ring.
	(2) Visually examine the bearing retaining ring for wear, damage, or fretting.	The bearing retaining ring must fit tight to the blade and the bearing race when installed over the blade and bearing race.	If wear, damage, or fretting is greater than the permitted serviceable limits, replace the bearing retaining ring.
	(3) Visually examine all of the bearing retaining ring for cadmium plating coverage.	A few random scratches and corners with cadmium plating missing are permitted; otherwise, complete coverage is required.	If cadmium plating is less than the permitted serviceable limits, cadmium replate the bearing retaining ring in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Bearing Race
Figure 5-53

Component Inspection Criteria
Table 5-1

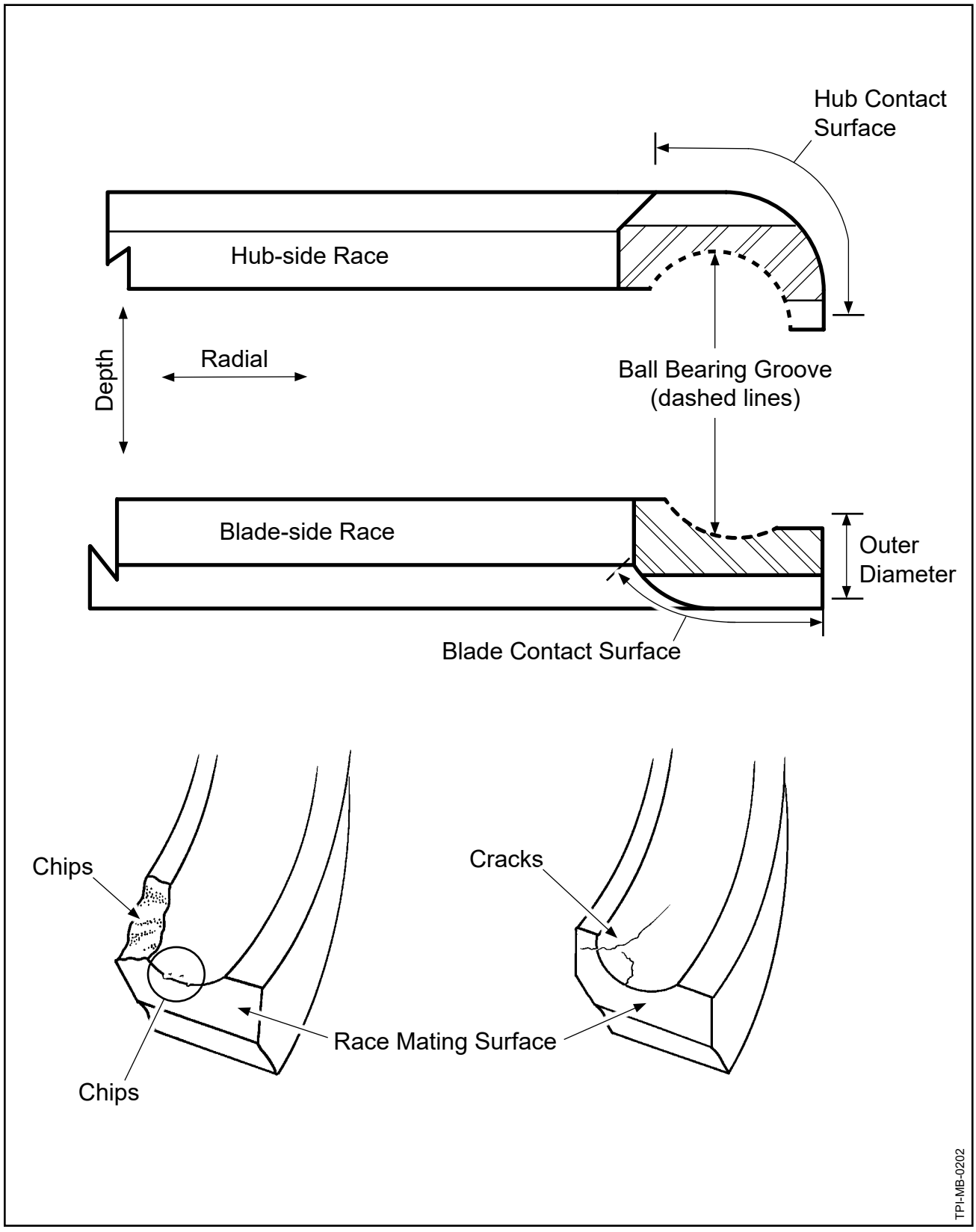
	Inspect	Serviceable Limits	Corrective Action
AT.	BEARING RACE, FOR ALL EXCEPT C-792-1 (Item 1050, 1070) Refer to Figure 5-53.		
	(1) Visually examine the ball bearing groove in each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A(61-01-02). If the corrosion product cannot be removed, replace the bearing race.
	(2) Visually examine the ball bearing groove in each bearing race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.003 inch (0.076 mm) in the ball bearing groove. The maximum permitted diameter of a pit is 0.032 inch (0.81 mm). The maximum permitted total area of pitting in the ball bearing groove on a complete bearing race is 0.12 square inch (77.4 square mm) (two bearing races for each bearing set). Pitting must not interfere with bearing ball movement or support.	If the pitting is greater than the serviceable limits, replace the bearing race.
		If the ball bearing groove has wear, measure the wear. The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the bearing race.
		Fretting damage is not permitted.	If there is fretting damage, replace the bearing race.
		For damage other than pitting or fretting, the maximum permitted depth of damage is 0.003 inch (0.076 mm) and must not interfere with bearing ball movement or support.	If damage is greater than the permitted serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AT.	BEARING RACE, FOR ALL EXCEPT C-792-1, CONTINUED (Item 1050, 1070) Refer to Figure 5-53.		
	(3) Except for the ball bearing groove, visually examine all other surfaces of each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing race.
	(4) Except for the ball bearing groove, visually examine all other surfaces of each race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of a pit is 0.062 inch (1.57 mm). The maximum permitted total area of pitting on all surfaces except the ball bearing groove of a complete bearing race is 0.25 square inch (161.2 square mm) (two bearing races for each bearing set).	If the pitting is greater than the permitted serviceable limits, replace the bearing race.
		Fretting damage is permitted on the outer diameter of the bearing races that interface with bearing retaining ring (1030). Fretting must not loosen the tight fit with the bearing retaining ring (1030).	Clean the fretted area thoroughly using an abrasive pad CM47 or equivalent to decrease fretting damage to a minimum. If the fit of the bearing retaining ring (1030) to the bearing race is not tight, replace the bearing race.
		Wear is not permitted.	If there is wear, replace the race.
		For damage other than pitting or fretting, the maximum permitted depth of damage is 0.005 inch (0.12 mm) and must not interfere with the mating surfaces.	If the damage is greater than the permitted serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AT.	BEARING RACE, FOR ALL EXCEPT C-792-1, CONTINUED (Item 1050, 1070) Refer to Figure 5-53.		
	(5) Visually examine the race for chips or cracks that are adjacent to the mating surfaces of the bearing race.	Chips or cracks that are adjacent to the mating surfaces of the bearing race are not permitted.	If there are chips or cracks adjacent to the mating surfaces of the bearing race, replace the bearing race.
	(6) Magnetic particle inspect each bearing race in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the bearing race.



C-792-1 Bearing Race
Figure 5-54

Component Inspection Criteria
Table 5-1

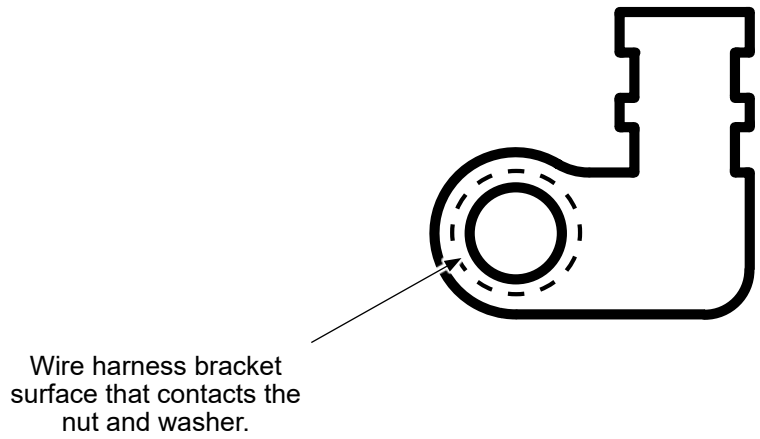
	Inspect	Serviceable Limits	Corrective Action
AU.	BEARING RACE, C-792-1 ONLY (Items 1050, 1070) Refer to Figure 5-54.		
(1)	Visually examine the ball bearing groove in each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing race.
(2)	Visually examine the ball bearing groove in each bearing race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.003 inch (0.076 mm) in the ball bearing groove. The maximum permitted diameter of a pit is 0.032 inch (0.81 mm). The maximum permitted total area of pitting in the ball bearing groove on a complete bearing race is 0.12 square inch (77.4 square mm) (two bearing races for each bearing set). Pitting must not interfere with bearing ball movement or support.	If the pitting is greater than the serviceable limits, replace the bearing race.
		If the ball bearing groove has wear, measure the wear. The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the bearing race.
		Fretting damage is not permitted.	If there is fretting damage, replace the bearing race.
		For damage other than pitting or fretting, the maximum permitted depth of damage is 0.003 inch (0.076 mm) and must not interfere with bearing ball movement or support.	If damage is greater than the permitted serviceable limits, replace the bearing race.
(3)	Visually examine the hard chrome plating in the ball bearing groove of each bearing race for flaking.	The maximum permitted total area of flaking in the ball bearing groove on a complete bearing race (blade side or hub side) is 5%.	If the flaking is greater than the serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AU. BEARING RACE, C-792-1 ONLY, CONTINUED (Items 1050, 1070) Refer to Figure 5-54.		
(4) Except for the ball bearing groove, visually examine all other surfaces of each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing race.
(5) Except for the ball bearing groove, visually examine all other surfaces of each bearing race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of a pit is 0.062 inch (1.57 mm). The maximum permitted total area of pitting on all surfaces except the ball bearing groove of a complete bearing race is 0.25 square inch (161.2 square mm) (two bearing races for each bearing set).	If the pitting is greater than the permitted serviceable limits, replace the bearing race.
	Fretting damage is permitted on the outer diameter of the bearing races that interface with the bearing retaining ring (1030). Fretting must not loosen the tight fit with the bearing retaining ring (1030).	Clean the fretted area thoroughly using an abrasive pad CM47 or equivalent to decrease fretting damage to a minimum. If the fit of the bearing retaining ring (1030) to the bearing race is not tight, replace the bearing race.
	Wear is not permitted.	If there is wear, replace the bearing race.
	For damage other than pitting or fretting, the maximum permitted depth of damage is 0.005 inch (0.12 mm) and must not interfere with the mating surfaces.	If the damage is greater than the permitted serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

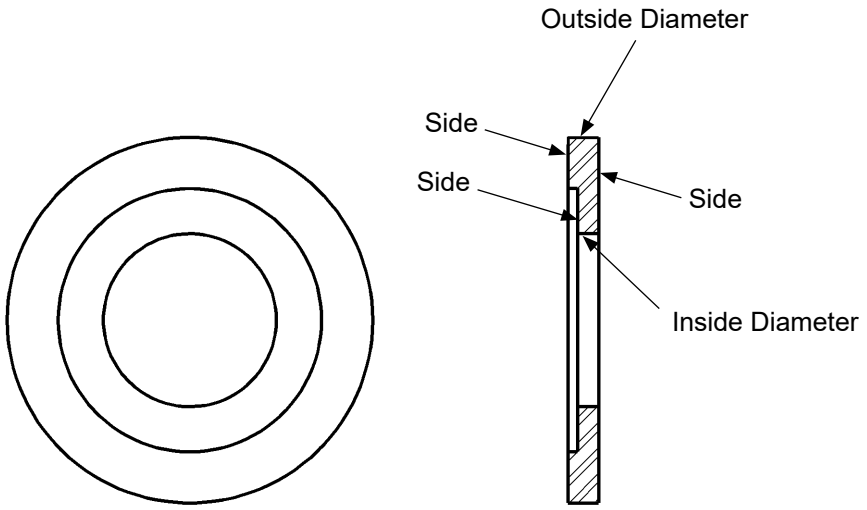
Inspect	Serviceable Limits	Corrective Action
AU. BEARING RACE, C-792-1 ONLY, CONTINUED (Items 1050, 1070) Refer to Figure 5-54.		
(6) Except for the ball bearing groove, visually examine the hard chrome plating on all other surfaces of each bearing race for flaking.	The maximum permitted total area of flaking for all other surfaces except the ball bearing groove on a complete bearing race (blade side or hub side) is 5%.	If the flaking is greater than the serviceable limits, replace the bearing race.
(7) Visually examine the bearing race for chips or cracks that are adjacent to the mating surfaces of the bearing race.	Chips or cracks that are adjacent to the mating surfaces of the bearing race are not permitted.	If there are chips or cracks adjacent to the mating surfaces of the bearing race, replace the bearing race.
(8) Magnetic particle inspect each bearing race in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to strip the hard chrome plating from the bearing race before magnetic particle inspection.	A relevant indication is not permitted.	If there is a relevant indication, replace the bearing race.



Wire Harness Bracket
Figure 5-55

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AV.	WIRE HARNESS BRACKET (Item 630) Refer to Figure 5-55.		
	(1) Visually examine the wire harness bracket for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum depth of pitting permitted is 0.007 inch (0.17 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the wire harness bracket. If the pitting is greater than the permitted serviceable limits, replace the wire harness bracket.
	(2) Visually examine the wire harness bracket for a crack.	A crack is not permitted.	If there is a crack, replace the wire harness bracket.
	(3) Visually examine the wire harness bracket surface that touches the nut and washer for damage.	Individual radial impressions caused by the nut and washer are permitted. Circumferential gouging that removes material is not permitted.	If the damage is greater than the permitted serviceable limits, replace the wire harness bracket.
	(4) Visually examine the wire harness bracket for cadmium plating coverage. NOTE: For the B-6265 bracket Revision O or later, the cadmium plating coverage check does not apply.	A maximum of 10% of visible base metal is permitted.	If cadmium plate coverage is less than the permitted serviceable limits, cadmium replate the wire harness bracket in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Retaining Washer
Figure 5-56

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AW.	RETAINING WASHER, p/n 103395 (Item 971) Refer to Figure 5-56.		
(1)	Visually examine the sides and inside diameter of the retaining washer for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.002 inch (0.05 mm). The maximum permitted total surface area that may have pitting is 5%. The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Pitting must not affect the fit or function of the retaining washer.	After applying masking material to the outside diameter of the retaining washer, corrosion product may be removed by glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the retaining washer. If pitting is greater than the serviceable limits, replace the retaining washer.
(2)	Visually examine the sides and inside diameter of the retaining washer for scratches.	The maximum permitted depth of a scratch is 0.002 inch (0.05 mm). Scratches must not affect the fit or function of the retaining washer.	If scratches are greater than the serviceable limits, replace the retaining washer.
(3)	Visually examine the retaining washer for wear or damage.	Wear or damage is not permitted.	If there is wear or damage, replace the retaining washer.
(4)	Visually examine the outside diameter of the retaining washer for corrosion product and pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the retaining washer.
(5)	Visually examine the outside diameter of the retaining washer for scratches.	A scratch is not permitted.	If there is a scratch, replace the retaining washer.

Component Inspection Criteria
Table 5-1

	Inspect		Serviceable Limits	Corrective Action
AW.	RETAINING WASHER, p/n 103395, CONTINUED (Item 971) Refer to Figure 5-56.			
	(6)	Visually examine the outside diameter of the retaining washer for wear or damage.	Wear or damage is not permitted in the base metal. If the sides or inside diameter were glass bead cleaned to remove corrosion product, examine the outside diameter for a rough surface from the glass bead cleaning. The maximum permitted surface finish is 16 Ra.	If wear or damage exceeds the serviceable limits, replace the retaining washer.
	(7)	Measure the outside diameter of the retaining washer.	The minimum permitted diameter after or over cadmium plate is 0.950 inch (24.13 mm).	If the diameter is smaller than the serviceable limits, replace the retaining washer.
	(8)	Visually examine the retaining washer for cadmium plate coverage.	A few random scratches are acceptable on the sides and inside diameter; otherwise, cadmium plate must completely cover the sides and inside diameter of retaining washer. Cadmium plate must completely cover the outside diameter without scratches although slight cadmium loss on the corners between sides and outside diameter is permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the retaining washer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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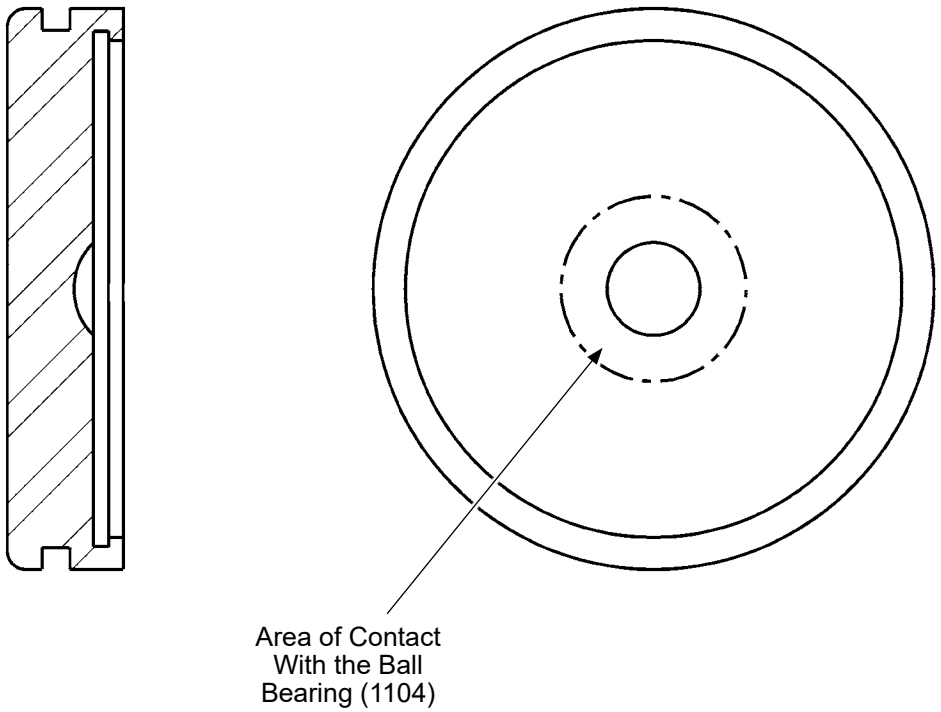

Blade Plug Inspection Area
Figure 5-57

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AX.	BLADE PLUG (Item 1103) Refer to Figure 5-57.		
(1)	Visually examine the blade plug for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting is not permitted where it would interface with the bearing ball. Pitting may not cover more than 10% of the blade plug surface.	Remove corrosion product to a maximum depth of 0.005 inch (0.12 mm) using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the blade plug. If the depth of the damage is greater than the permitted serviceable limits, replace the blade plug.
(2)	Visually examine the blade plug for wear or scoring damage in the area of contact with the ball bearing.	If the blade plug is worn or damaged, measure the depth of wear or damage. The maximum permitted depth of wear or damage is 0.004 inch (0.10 mm) beyond the surrounding undamaged surface. The surface finish in the area of contact with the ball bearing must be 32 Ra or smoother.	Using an abrasive pad CM47 or equivalent, polish to remove wear or damage and maintain a surface finish of 32 Ra or smoother. The maximum permitted depth of repair is 0.004 inch (0.10 mm) beyond the surrounding unrepaired surface. If wear or damage is greater than the permitted serviceable limits, replace the blade plug.
(3)	Visually examine the blade plug for scratches, gouges, or other damage, outside of the area of contact with the ball bearing.	The maximum permitted depth of damage is 0.005 inch (0.12 mm). Damage must not interfere with the blade plug fit into the blade bore.	Using an abrasive pad CM47 or equivalent, polish pushed up material to blend with the surrounding surfaces. If damage is greater than the permitted serviceable limits, replace the blade plug.
(4)	Visually examine the blade plug for cadmium plating coverage.	Minor wear on corners and a few light random scratches are permitted; otherwise, cadmium plating must completely cover the blade plug.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake for a minimum of 23 hours the blade plug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AY.	BALANCE WEIGHT (Item 1120)		
(1)	Visually examine the balance weight for corrosion product.	Corrosion product is not permitted. Remove corrosion product in accordance with the corrective action instructions.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the balance weight.
(2)	Visually examine the balance weight for pitting, wear, or damage.	The maximum permitted depth of pitting, wear, or damage is 0.003 inch (0.07 mm).	Using an abrasive pad CM47 or equivalent, polish to a maximum depth of 0.005 inch (0.12 mm). If the depth of pitting, wear, or damage is greater than the permitted serviceable limits or the corrective action limits replace the balance weight.
(3)	For an aluminum (gray color) balance weight: Visually examine the balance weight for anodize coverage.	Except for a few scratches and corners with anodize coating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, re-anodize the weight in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(4)	For a steel (silver color) balance weight: Visually examine for cadmium plating coverage.	Except for a few scratches and corners with cadmium plating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, replate the weight in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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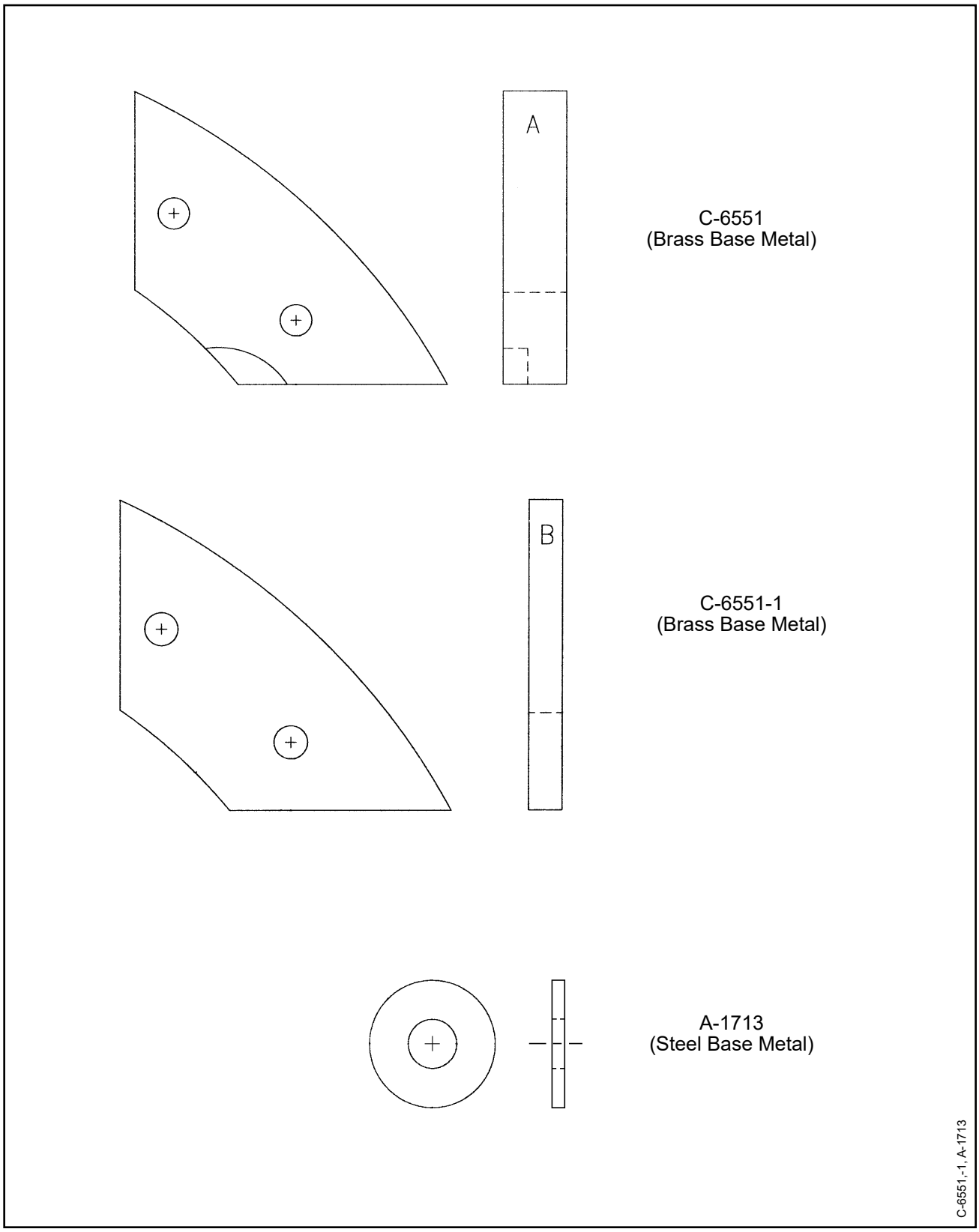
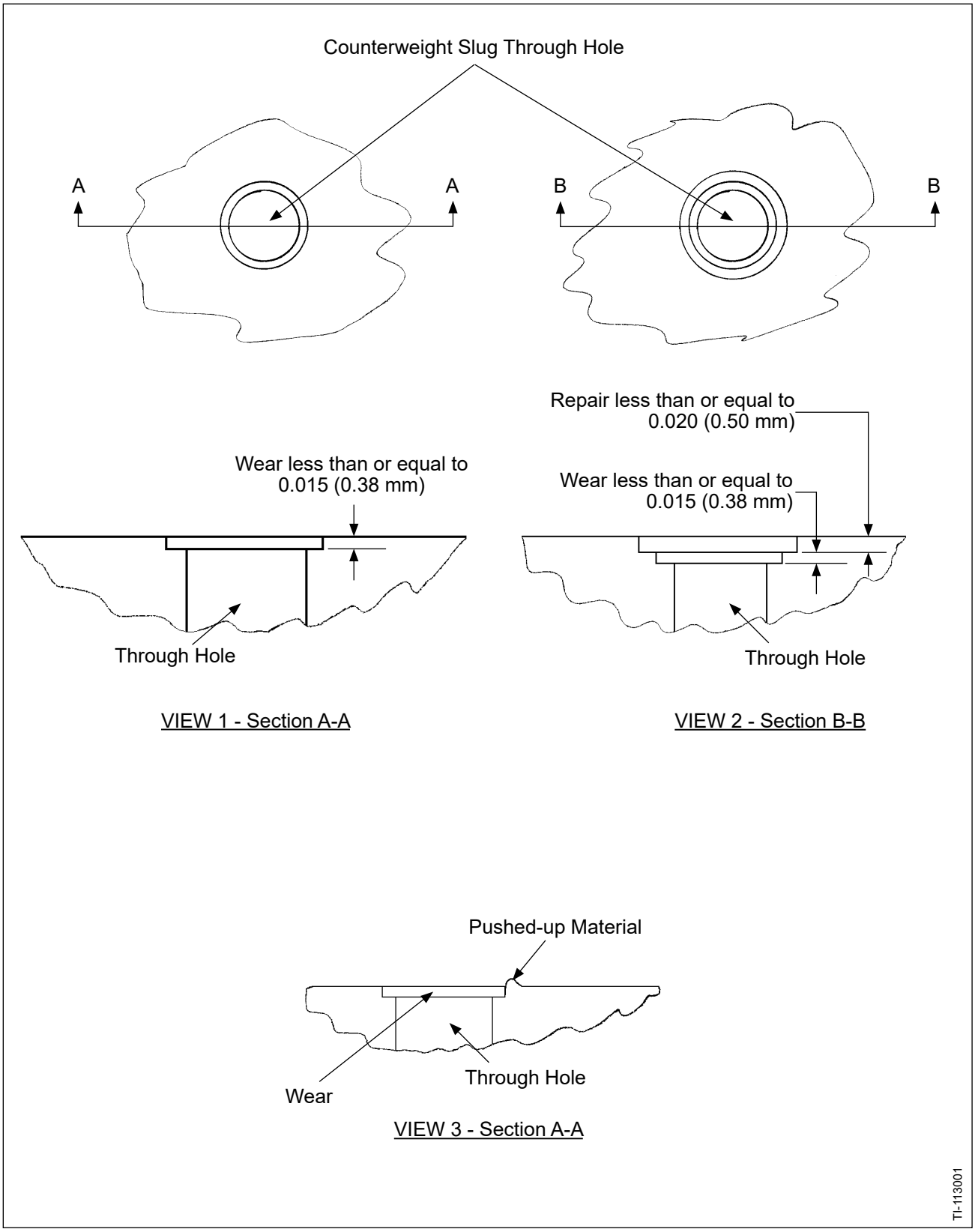


Counterweight Slug Identification
Figure 5-58

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AZ.	COUNTERWEIGHT SLUG - C-6551 AND C-6551-1 (BRASS BASE METAL) (Item 9040) Refer to Figure 5-58.		
	CAUTION: DO NOT USE CHEMICAL STRIPPING TO REMOVE THE CADMIUM PLATING FROM A BRASS COUNTERWEIGHT.		
	Before inspection of the C-6551 or C-6551-1 counterweight slug, remove the cadmium plating by mechanically stripping, using glass bead cleaning, in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
	(1) Visually examine the counterweight slug for removal of the cadmium plating.	Cadmium plating must be completely removed from the counterweight slug.	Using glass bead cleaning, remove the cadmium plating. Refer to Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	(2) Visually examine the counterweight slug for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	CAUTION: MAJOR MATERIAL REMOVAL WILL AFFECT WEIGHT AND COULD AFFECT PROPELLER DYNAMIC BALANCE AS BLADES CHANGE ANGLE DURING PROPELLER ROTATION.		
	(3) Visually examine the counterweight slug for pitting or wear.	The maximum permitted depth of pitting or wear is 0.005 inch (0.12 mm). Pitting or wear that interferes with installation, fit, or function of the counterweight slug is not permitted.	Pitting or wear may be polished up to 0.010 inch (0.25 mm) deep using an abrasive pad CM47 or equivalent. If the depth of pitting, wear, or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the counterweight slug.
	(4) Visually examine each counterweight slug for scratches, gouges, or other damage.	The maximum permitted depth of a scratch, gouge, or damage is 0.050 inch (1.27 mm). Damage that interferes with installation, fit, or function of the counterweight slug is not permitted.	Material that is pushed up above the normal surface is not permitted. Remove all pushed up material by polishing with an abrasive pad CM47 or equivalent. If a scratch, gouge, or other damage is greater than the permitted serviceable limits, replace the counterweight slug.



Counterweight Slug Through Hole Wear
Figure 5-59

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AZ.	COUNTERWEIGHT SLUG - C-6551 AND C-6551-1 (BRASS BASE METAL) CONTINUED (Item 9040) Refer to Figure 5-59.		
	(5) Visually examine around each through hole for wear caused by the retention bolt or nut.	The maximum permitted depth of wear is 0.015 inch (0.38 mm). Refer to View 1 and View 2. Material that is pushed-up above the normal surface is not permitted. Refer to View 3.	Remove all pushed-up material by polishing with an abrasive pad CM47 or equivalent. If wear is greater than the permitted serviceable limits, repair the weight slug in accordance with the section, "Brass Counterweight Slug Mounting Hole Repair" in the Repair chapter of this manual. If the wear and repair are collectively greater than the permitted serviceable limits and repair limits, replace the counterweight slug.
	(6) Penetrant inspect the counterweight slug in accordance with the Penetrant Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted.	If there is a relevant indication, replace the counterweight slug.
	After successfully completing the inspections required in paragraphs (1) through (6) in this component inspection criteria, cadmium plate to Type II, Class 1, the C-6551 or C-6551-1 counterweight slug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
	(7) Visually examine the counterweight slug for cadmium plating, especially in the through holes for attachment.	Complete cadmium plating coverage is required, especially in the through holes for attachment.	If the cadmium plating coverage is less than the permitted serviceable limits, remove the cadmium plating by mechanically stripping, using glass bead cleaning, and cadmium replate the counterweight with Type II, Class 1 coverage in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
BA.	COUNTERWEIGHT SLUG - A-1713 (STEEL BASE METAL) (Item 9040) Refer to Figure 5-59.		
	(1) Visually examine each counterweight slug for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the counterweight slug.
	CAUTION: MAJOR MATERIAL REMOVAL WILL AFFECT WEIGHT AND COULD AFFECT PROPELLER DYNAMIC BALANCE AS BLADES CHANGE ANGLE DURING PROPELLER ROTATION.		
	(2) Visually examine each counterweight slug for pitting or wear.	The maximum permitted depth of pitting or wear is 0.005 inch (0.12 mm). Pitting that interferes with installation, fit, or function of the counterweight slug is not permitted.	Pitting or wear may be polished up to 0.010 inch (0.25 mm) deep using an abrasive pad CM47 or equivalent. If the depth of pitting, wear, damage, or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the counterweight slug.
	(3) Visually examine each counterweight slug for scratches, gouges, or other damage.	The maximum permitted depth of a scratch, gouge, or other damage is 0.035 inch (0.88 mm). Damage that interferes with installation, fit, or function of the counterweight slug is not permitted.	Material that is pushed up above the normal surface is not permitted. Remove all pushed up material by polishing with an abrasive pad CM47 or equivalent. If a scratch, gouge, or other damage is greater than the permitted serviceable limits, replace the counterweight slug.
	(4) Visually examine each counterweight slug for cadmium plating coverage.	Except for a few scratches and corners with cadmium plating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, cadmium replate the counterweight slug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

REPAIR - CONTENTS

LIST OF FIGURES

WARNING 1: DO NOT ATTEMPT IN THE FIELD ANY REPAIR, REPLACEMENT, REPLATING, RE-ANODIZING, OR RE-SHOT PEENING PROCEDURE NOT SPECIFICALLY AUTHORIZED BY HARTZELL PROPELLER INC. OR NOT SPECIFICALLY REFERRED TO IN HARTZELL PROPELLER INC. MANUALS. CONTACT HARTZELL PROPELLER INC. FOR GUIDANCE ABOUT THE AIRWORTHINESS OF ANY PART WITH UNUSUAL WEAR OR DAMAGE.

WARNING 2: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

1. General Repair Requirements (Rev. 2)

   A. Shot Peening

      CAUTION: THE PEENING MARKS ON CERTAIN PROPELLER PARTS ARE NOT TOOL MARKS AND SHOULD NOT BE REMOVED.

      (1) Some propeller assembly parts have been shot peened at Hartzell Propeller Inc. to improve fatigue strength.

      (2) Shot peened surfaces may require re-shot peening because of rust, corrosion, fretting, or nicks. For shot peening procedures, refer to the Shot Peening chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

         WARNING: FAILURE TO CORRECTLY SHOT PEEN APPLICABLE PROPELLER PARTS MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. A QUALITY SHOT PEENING PROCESS IS CRITICAL FOR FLIGHT SAFETY. SHOT PEENING OF PROPELLER PARTS REQUIRES SPECIAL TECHNIQUES, TRAINING, MATERIALS, AND EQUIPMENT.

         (a) Only repair stations that are properly certified by Hartzell Propeller Inc. should shot peen Hartzell propeller parts.

1 For certification requirements, refer to the Approved Facilities chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

2 For a list of repair stations that are certified by Hartzell Propeller Inc. to perform shot peening on Hartzell propeller parts:

a Go to the Sample Program Approvals page on the Hartzell Propeller Inc. website at www.hartzellprop.com

b Contact Hartzell Propeller Inc. Product Support

(1) Refer to the section, "Contact Information" in the Introduction chapter of this manual.

B. Aluminum and Steel Parts

(1) Remove scratches, nicks, burrs, and other minor damage using a fine emery cloth or abrasive pad, such as CM47.

(a) Blend the polished area in with the surrounding area.

(b) Use extreme care to completely remove the damage while removing as little material as possible.

(2) After any repair, inspect the part in accordance with the applicable inspection criteria to be sure it is within the permitted limits.

2. Repair/Modification Procedures (Rev. 3)

A. Propeller Components (Except for those listed separately in this section)

(1) For repair and modification procedures of propeller components (except for those listed separately in this section), refer to the applicable section in this chapter.

B. Hubs

(1) Aluminum Hubs: Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Blades

(1) Aluminum Blades: Refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) Composite Blades: Refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

D. Blade Clamps (For steel hub propellers only)

(1) Refer to the Blade Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

E. Spinner Assemblies

(1) Metal Spinners: Refer to Hartzell Propeller Inc. Metal Spinner Maintenance Manual 127 (61-16-27).

(2) Composite Spinners: Refer to Hartzell Propeller Inc. Composite Spinner Maintenance Manual 148 (61-16-48).

F. Ice Protection Systems

(1) For ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) For ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

3. Specific Repair Requirements

A. Repair of Damaged Balance Weight Attachment Holes

(1) For requirements and procedures for repair of balance weight attachment holes and lubrication fitting holes, refer to the Aluminum Hub Overhaul chapter of Hartzell Standard Practices Manual 202A (61-01-02).

B. Repair of Damaged Cylinder Wrench Attachment Holes

(1) For requirements and procedures for repair of damaged cylinder wrench attachment holes, refer to the Standard Repairs and Instructions chapter of Hartzell Standard Practices Manual 202A (61-01-02).

C. Repair of Damaged Cylinder Start Lock Cover Attachment Holes

(1) For requirements and procedures for repair of damaged cylinder start lock cover attachment holes, refer to the Standard Repairs and Instructions chapter of Hartzell Standard Practices Manual 202A (61-01-02).

D. Repair of Fork Non-machined Areas

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) Shallow forging laps or folds in non-machined areas of the fork are repairable in accordance with the following procedure.

(b) Perform the procedure only on forks with the following part numbers:

D-495-( ) D-496-( )

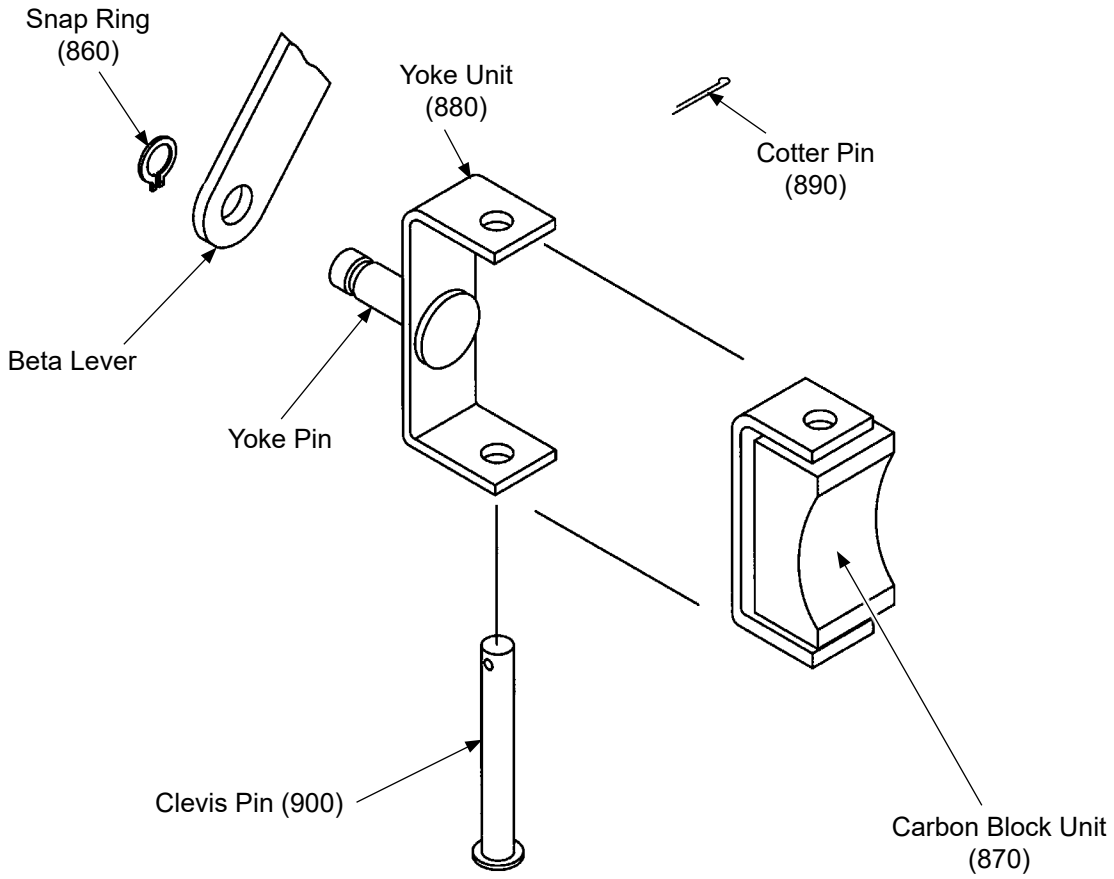
(2) Procedure

(a) Remove the Cadmium plating from the fork. Refer to the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(b) Magnetic particle inspect the fork and mark the indications. Refer to the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02.

(c) Refer to the Check chapter of this manual for serviceable limits.

VIDEO



Beta Feedback Block Assembly
Figure 6-1

(d) Grind and polish the fork to remove all indications found in the forged surfaces between the arms with milled slots.

1 Indications must not be closer than 0.200 inch (5.08 mm) to the adjacent milled surfaces, except indications may come up to the corner of the forged and machined surface within 0.5 inch (12.7 mm) radius of the spacer knob center.

2 Inside radii must not be less than 0.125 inch (3.18 mm).

(e) Inspect the depth of the repair. The maximum permitted repair depth is 0.015 inch (0.38 mm).

(f) Inspect the surface finish of the repair. The maximum permitted repair finish is 63 micro-inch.

(g) Magnetic particle inspect the fork. Refer to Hartzell Manual 202A (61-01-02), Magnetic Particle Inspection chapter.

1 If an indication is found, repeat steps 5.D.(2)(c) through 5.D.(2)(f). The maximum total depth of repair is 0.015 inch (0.38 mm).

2 If there are no indications found, continue with steps below.

(h) Cadmium plate and bake the fork. Refer to the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(i) Inspect the cadmium plating in accordance with the serviceable limits in the Check chapter of this manual.

E. Beta Feedback Block Assembly

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) Repair of Binding Problem

(a) General

1 The clearance between the yoke pin and the corresponding linkage (beta lever bushing) may become too close because of a buildup of plating and foreign particles between the two pieces (Refer to Figure 6-1). This may cause binding, and may result in excessive wear to the carbon block, beta ring, and beta linkage.

(b) Repair Procedure

1 Inspect the beta lever and beta feedback block assembly (850) interface for free movement.

2 If there is binding between the yoke pin and the corresponding linkage (beta lever bushing), perform the following steps:

a Disconnect the beta linkage.

b Remove the beta feedback assembly (850) from the beta ring (840).

c Polish the yoke pin to provide adequate clearance and to eliminate binding.

d Reinstall the beta feedback block assembly (850) into the beta ring (840). Refer to the Beta Feedback Block Assembly section of the Fits and Clearances chapter of this manual.

e Reconnect the beta linkage to the beta feedback block assembly (850).

f Reinspect to make sure that binding between the beta lever and beta feedback block assembly (850) interface has been eliminated.

(2) Replacement of Carbon Block Unit or Yoke Unit in the Beta Feedback Block Assembly

CAUTION: The carbon block unit (870) must be replaced at overhaul.

(a) If the carbon block unit (870) and/or the yoke unit (880) become excessively worn between overhaul intervals, replacement of one or both parts is necessary. Refer to Figure 6-1.

1 Remove the cotter pin (890) from the end of the clevis pin (900).

2 Slide the clevis pin (900) from the assembly.

3 Remove the carbon block unit (870).

4 Replace the yoke unit (880) if beyond serviceable limits listed in the Check chapter of this manual, or replace the carbon block unit (870) if excessive wear or damage is present.

5 Slide the clevis pin (900) into place.

6 Secure the clevis pin (900) with a cotter pin (890).

7 Refit the carbon block unit (870).

8 Refer to the Beta Feedback Block Assembly section of the Fits and Clearances chapter of this manual.

9 Establish the required clearance by dressing the block sides as necessary.

F. Beta Ring Repair

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General Repair

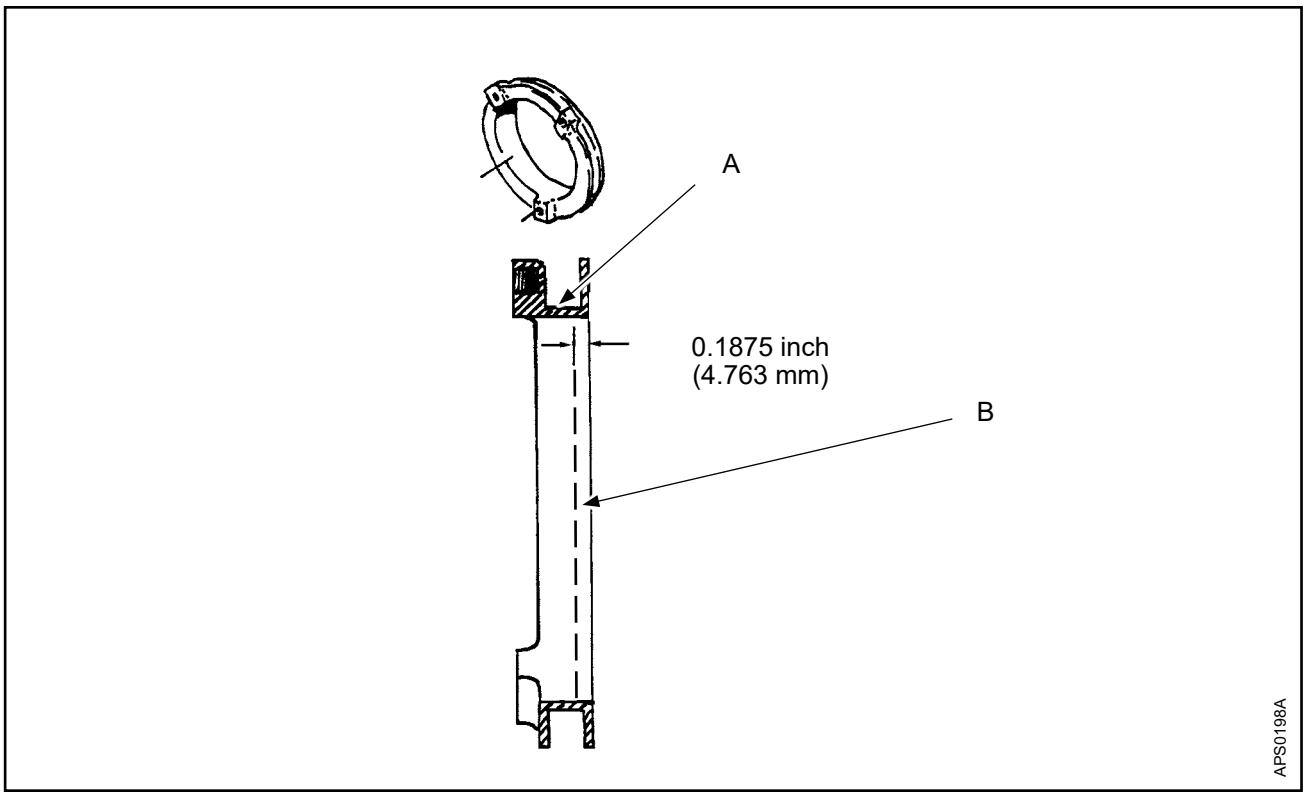
(a) Using a soft cotton wheel, polish the beta ring (840).

(2) Interior Surface Repair

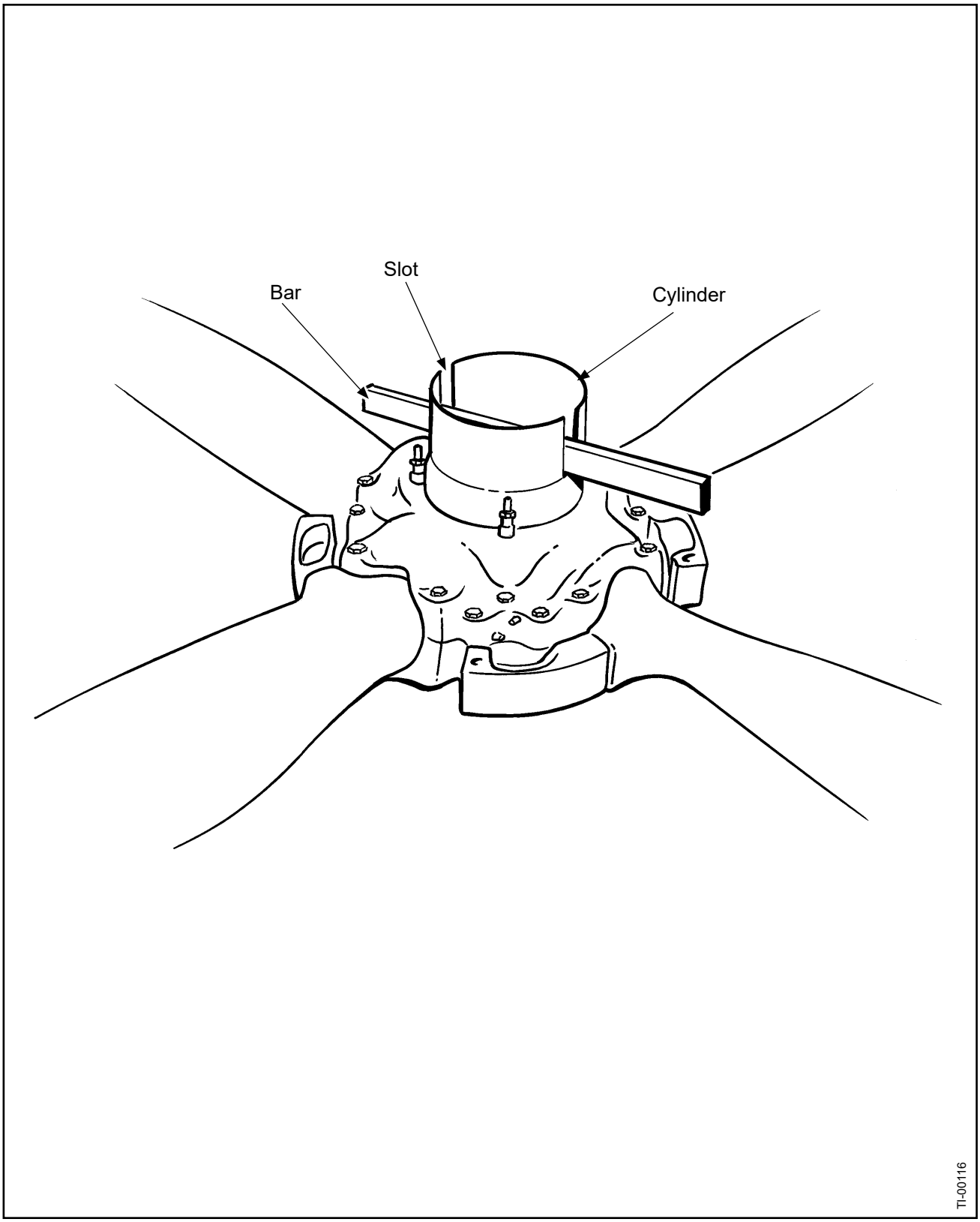
(a) The surface of the beta ring groove may be repaired if it is worn or scratched:

1 Remove grooves or scratches in areas A and B (Figure 6-2). Refer to the serviceable limits found in the Check chapter of this manual.

2 Using 80- to 120-grit emery cloth and finishing with 240-grit polishing compound, make the surfaces of the beta ring smooth.



Beta Ring Interior Surface Repair
Figure 6-2



Cylinder Removal
Figure 6-3

G. Cylinder Removal

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION INVOLVES PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) This procedure is to aid in the removal of a cylinder that the threads have bound on the hub threads. Although this procedure requires the replacement of the cylinder, the hub may not have to be replaced. Refer to Figure 6-3.

(2) Removal Procedure

CAUTION: MAKE SURE THAT THE PROPELLER IS IN FEATHER BEFORE ATTEMPTING THE REMOVAL OF THE CYLINDER.

(a) Mark a line around the cylinder 3 to 4 inches (76 to 102 mm) above the hub.

CAUTION: DO NOT DAMAGE THE PISTON AND/OR FEATHERING COMPRESSION SPRING WHEN CUTTING THE CYLINDER.

(b) Cut around the circumference of the cylinder and remove the portion that is cut.

(c) Remove the pitch change rod from the fork.

CAUTION: DO NOT DAMAGE THE HUB THREADS WHEN CUTTING THE SLOTS IN THE CYLINDER.

(d) Cut two slots from the outboard end of the cylinder to the outboard end of the hub threads, as follows:

1 The slots must be 180 degrees from each other.

2 The slots must be approximately 0.75 inch (19 mm) wide.

3 Each slot must come to a point at the outboard end of the hub threads.

CAUTION: DO NOT DAMAGE THE HUB THREADS WHEN CHISELING A NOTCH INTO THE CYLINDER.

(e) Using a chisel, notch the cylinder just below the slots.

(f) Put a bar in the cut slots of the cylinder.

(g) Using the bar, turn the cylinder counterclockwise. The cylinder will either turn off or break at the chiseled notches.

H. Feather Compression Spring Zinc Chromate Primer Repair

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION INVOLVES PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) Cleaning

(a) For procedures for cleaning the feather spring (260), refer to Cleaning of Steel Parts in the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(b) Inspect the feather compression spring (260) for scratches, corrosion, and zinc plate coverage in accordance with the Check chapter of this manual.

(c) Remove any loose material and feather the existing coating with 120 to 180 grit sandpaper.

(d) Using solvent CM106, clean the entire feather spring (260).

(e) Permit the solvent CM106 to air dry.

(2) Painting

NOTE: For general information about finishing procedures, refer to the Paint and Finish chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(a) Apply a layer of zinc chromate primer, CM67, or equivalent, to the entire surface of the feather compression spring (260).

(b) Permit the primer to dry for a minimum of 24 hours before handling.

(c) Examine the feather compression spring (260) for complete primer coverage.

I. Reverse Adjust Sleeve Bushing Removal and Installation

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) Removal Procedure

(a) Put a customer supplied 1.187 inch diameter reamer in a vise.

(b) Put the non-threaded end of the reverse adjust sleeve over the reamer.

CAUTION: DO NOT DAMAGE THE REVERSE ADJUST SLEEVE OR REMOVE METAL FROM THE REVERSE ADJUST SLEEVE SHOULDER THAT IS NEXT TO THE BUSHING WHEN REMOVING THE BUSHING.

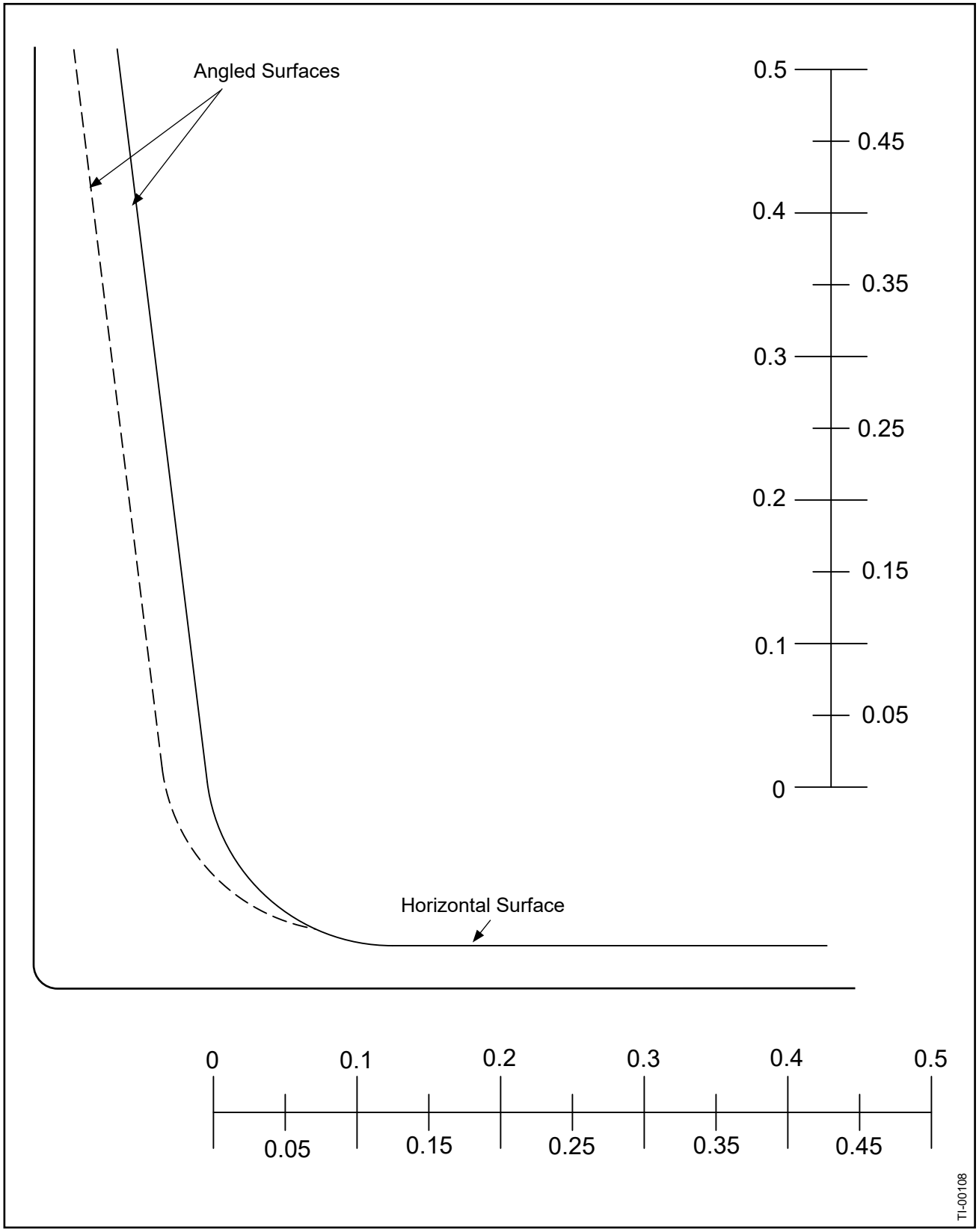
(c) By hand, turn the reverse adjust sleeve on the reamer to cut out the bushing.

NOTE: To make it easier to turn the reverse adjust sleeve, a tool may be made that functions as a handle. To make the tool, weld a small metal bar to a nut that will fit on the threaded end of the reverse adjust sleeve. Install the tool on the reverse adjust sleeve.

(d) Using plastic media, remove the remaining bushing and adhesive. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(2) Installation Procedure

(a) Install a new bushing. Refer to the Special Adhesive and Bonding chapter of chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Optical Comparator Overlay
Figure 6-4

J. Inspection of the Internal Surface of a Cylinder

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION INVOLVES PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

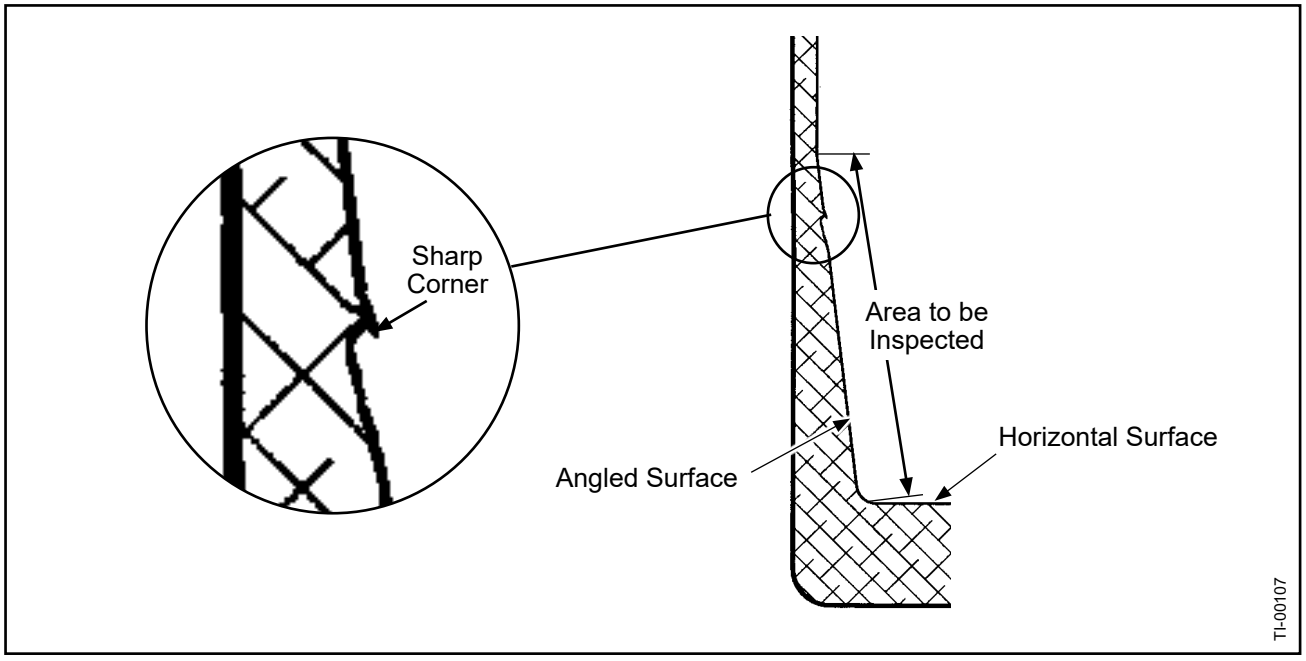
(1) General

(a) Use this procedure to inspect the rough part of an internal surface of a cylinder for depth of material loss when required by the Serviceable Limits in the Check chapter of this manual. Refer to Figure 6-5.

(b) An optical comparator and replication putty CM125 is required for this inspection.

1 An optical comparator is a device that projects a magnified profile image of the object onto a screen. The image is then compared to a clear overlay that has the required shape imprinted on its surface.

2 For a list of vendors that produce an optical comparator considered acceptable for inspection purposes, refer to optical comparators TE28 in the Hartzell Propeller Inc. Tool and Equipment Manual 165A (61-00-65).



Inspection for a Sharp Corner
Figure 6-5

(c) A pattern for the overlay required for this inspection is provided as Figure 6-4.

1 Figure 6-4 is drawn correctly for 20X magnification.

2 If a different magnification is desired, use figure 6-4 as a pattern and adjust the scale, as necessary, for the different magnification.

3 Make a clear overlay to use with the optical comparator.

(2) Inspection for a Sharp Corner. Refer to Figure 6-5.

(a) Move your finger across the rough surface area of the cylinder.

(b) If there is any material that catches on the skin of your finger, then there is a sharp corner. Refer to the Check chapter of this manual for the serviceable limits about a sharp corner of the cylinder.

(3) Dimensional Inspection

(a) Making the Mold

NOTE: Make sure that the replication mold includes the deepest area of the rough part of the internal surface of the area to be inspected and some of the horizontal surface used for staging.

1 Using two-part replication putty CM125, make a replication mold of the area that will be dimensionally inspected. Refer to the section "Measuring Depth of Damage with Replication Material" in the Standard Repairs and Instructions chapter of Hartzell Standard Practices Manual 202A (61-01-02).

(b) Alignment of the Overlay on the Optical Comparator Screen

1 Set the optical comparator for the magnification that correctly matches the overlay.

2 Put the overlay on the screen of the optical comparator in approximately the final position.

3 Lightly clip the overlay in place so that the overlay can be shifted for exact alignment.

4 Adjust the stage so that an image of the stage surface appears halfway up on the screen.

5 Adjust the overlay on the screen so that the horizontal surface of the overlay aligns with the stage surface.

(c) Alignment of the Cylinder Replication Mold on the Overlay

1 Put the horizontal surface of the cured cylinder replication mold on the stage.

2 Adjust the horizontal position of the vertical surface of the cylinder replication mold to position all parts of the vertical surface of the replication mold between the vertical surface lines on the optical comparator overlay, if possible.

(d) Compare the projected image with the overlay.

1 If the projected image of the vertical surface of the cylinder replication mold falls between the solid line on the overlay and the dotted line on the overlay, the depth below the surrounding machined surface is 0.030 inch (0.76 mm) or less.

2 Refer to the Check chapter of this manual for the serviceable limits about the permitted depth for the rough surface of the cylinder.

K. Brass Counterweight Slug Mounting Hole Repair

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) This procedure provides the instructions to remove wear around the counterweight slug mounting through hole.

(2) Procedure

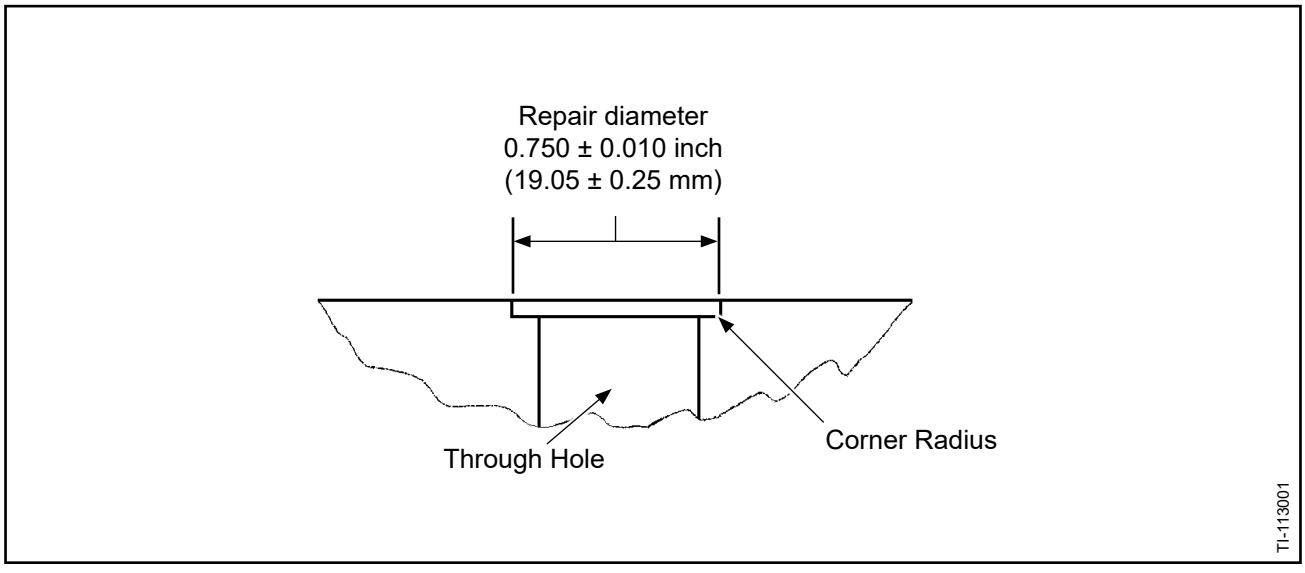
(a) Use a locally procured end mill cutter that is 0.750 ± 0.010 inch (19.05 ± 0.25 mm) outside diameter.

1 The corner radius blending between the outside diameter and the cutting end must be 0.005 to 0.033 inch (0.13 to 0.83 mm).

(b) Put the brass weight slug in the end mill.

CAUTION: MAKE SURE THAT THE BRASS WEIGHT SLUG IS HELD TIGHTLY IN PLACE WITH THE THROUGH HOLE CENTERED UNDER THE END MILL CUTTER.

(c) Center the through hole that is to be repaired under the end mill cutter and make sure that the brass weight slug is held tightly in place.



Brass Counterweight Slug Mounting Hole Repair
Figure 6-6

CAUTION: DO NOT SPOTFACE DEEPER THAN THE MAXIMUM PERMITTED DEPTH.

(d) Spotface the brass weight slug to remove wear damage.

1 The maximum permitted depth of repair is 0.020 inch (0.50 mm).

2 Spotface to a greater depth is not permitted.

3 If the repair is greater than the maximum permitted depth of repair, replace the brass weight slug.

(e) Remove all burrs.

(f) Break any sharp corners.

(g) Visually examine the repair to make sure that the repair is centered on the through hole.

(h) Cadmium plate of any bare brass surface is required. Refer to the Check chapter of this manual.

L. Rebonding the 103826 Beta Switch Indicator Ring to the 103825 Beta Ring Unit

(1) Rebond the 103826 beta switch indicator ring to the 103825 beta ring unit in accordance with the section, "Bonding the Beta Switch Indicator Ring to the Beta Ring Unit" in the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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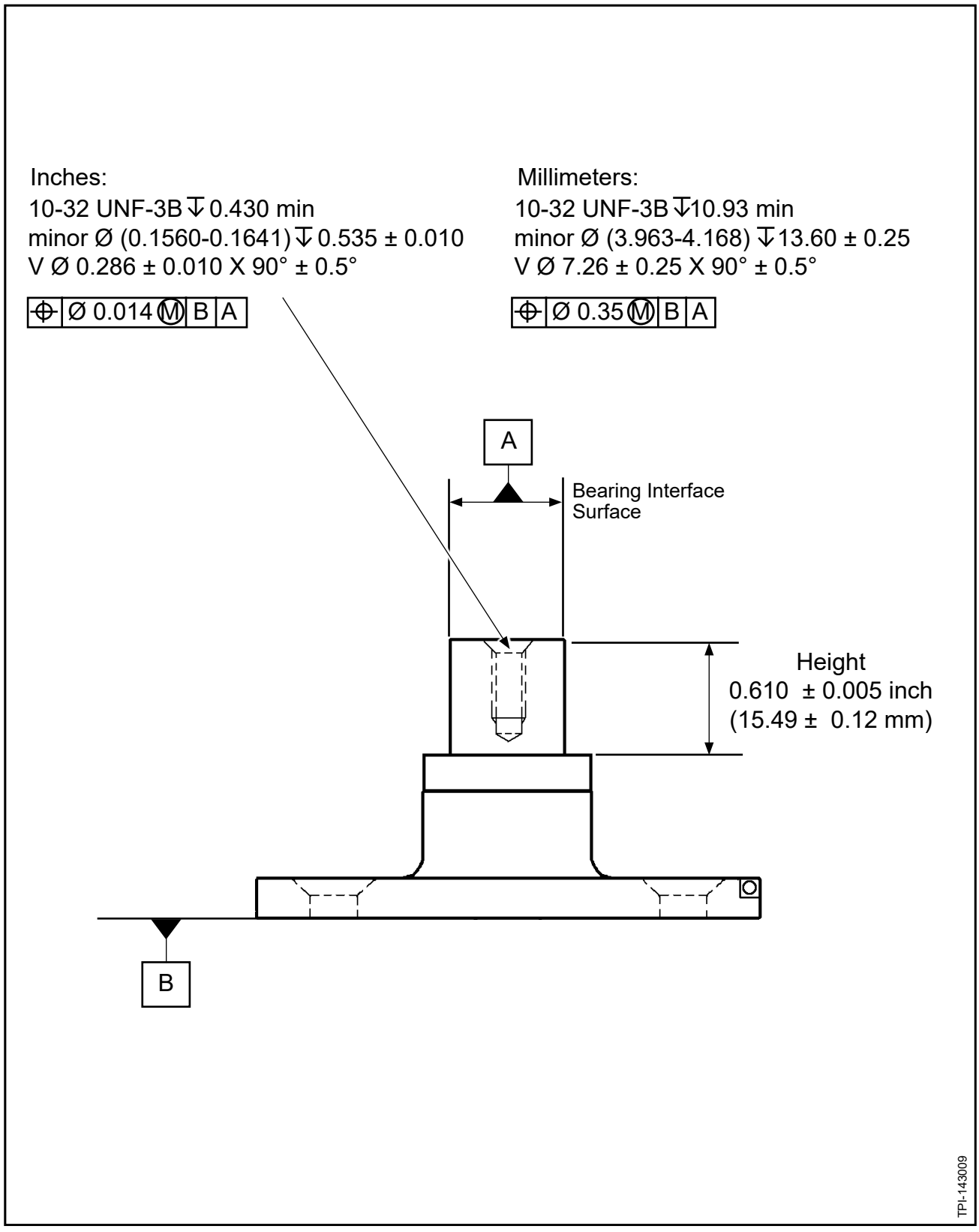


Pitch Change Knob Bracket Modification
Figure 6-7

M. Pitch Change Knob Bracket Modification - Refer to Figure 6-7

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) The pitch change knob bracket must have been inspected in accordance with the section "Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower" in the Check chapter of this manual.

1 Only inspection criteria that is associated with the retaining washer shoulder is permitted to not pass inspection.

(2) Modification Procedure

(a) Mill off the retaining washer shoulder of the pitch change knob bracket to the height given in Figure 6-7.

(b) Drill, thread, and countersink/chamfer to the dimensional and true position requirements as specified in Figure 6-7.

WARNING: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

(c) Using solvent CM106 MEK or CM219 MPK, clean the threaded hole and permit the threads to dry.

(d) Apply masking material to the pitch change knob bearing interface surface.

(e) Reapply cadmium plating to all unmasked surfaces and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(f) Inspect all machined dimensions and true position requirements in Figure 6-7 to make sure that all specified modification requirements have been met.

(g) Using a go-nogo thread gauge, inspect the 10-32UNF-3B threaded hole to make sure that it meets the pitch diameter requirements for the specified thread.

(h) Use metal impression stamping or vibra engraving to mark the modified pitch change knob bracket with the letter "**A**" at the end of the part number in accordance with the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

NOTE: A part number with an **A** suffix will identify that it is a modified pitch change knob bracket unit.

N. Preload Plate Assembly Inner Bearing Race Replacement

CAUTION: ONLY DO THIS PROCEDURE IF THERE IS A SUFFICIENT AMOUNT OF SPACE BETWEEN THE BOTTOM OF THE INNER BEARING RACE (1000) AND THE SURFACE OF THE PRELOAD PLATE (990). DO NOT DO THIS PROCEDURE IF THE BOTTOM OF THE INNER BEARING RACE (1000) IS TOUCHING THE PRELOAD PLATE (990).

(1) Removing and Installing the Preload Plate Inner Bearing Race (1000) to the Preload Plate Spindle

CAUTION: WHEN REMOVING THE INNER BEARING RACE (1000), USE CARE TO NOT DAMAGE THE PRELOAD PLATE (990) THREADS.

(a) Remove the inner bearing race (1000) using the puller TE98 or a locally procured tool.

1 If using puller TE98, put a spacer below the collar of the puller TE98 to keep the puller TE98 from touching the preload plate (990) threads.

(b) Discard the inner bearing race (1000).

(c) Do the required inspections of the preload plate spindle in accordance with the Check section of this manual.

(d) Using number 4 oil, CM80, lubricate the inside diameter of the new inner bearing race (1000).

(e) Put the preload plate (990) in a locally procured fixture.

CAUTION 1: THE FORCE WHEN PUSHING THE INNER BEARING RACE (1000) ONTO THE PRELOAD PLATE (990) MUST NOT BE GREATER THAN 5000 POUNDS.

CAUTION 2: WHEN PUSHING THE INNER BEARING RACE (1000) ONTO THE PRELOAD PLATE SPINDLE, USE CARE TO NOT DAMAGE THE PRELOAD PLATE (990) THREADS.

(f) Push the inner bearing race (1000) over the preload plate spindle. Refer to Figure 6-8.

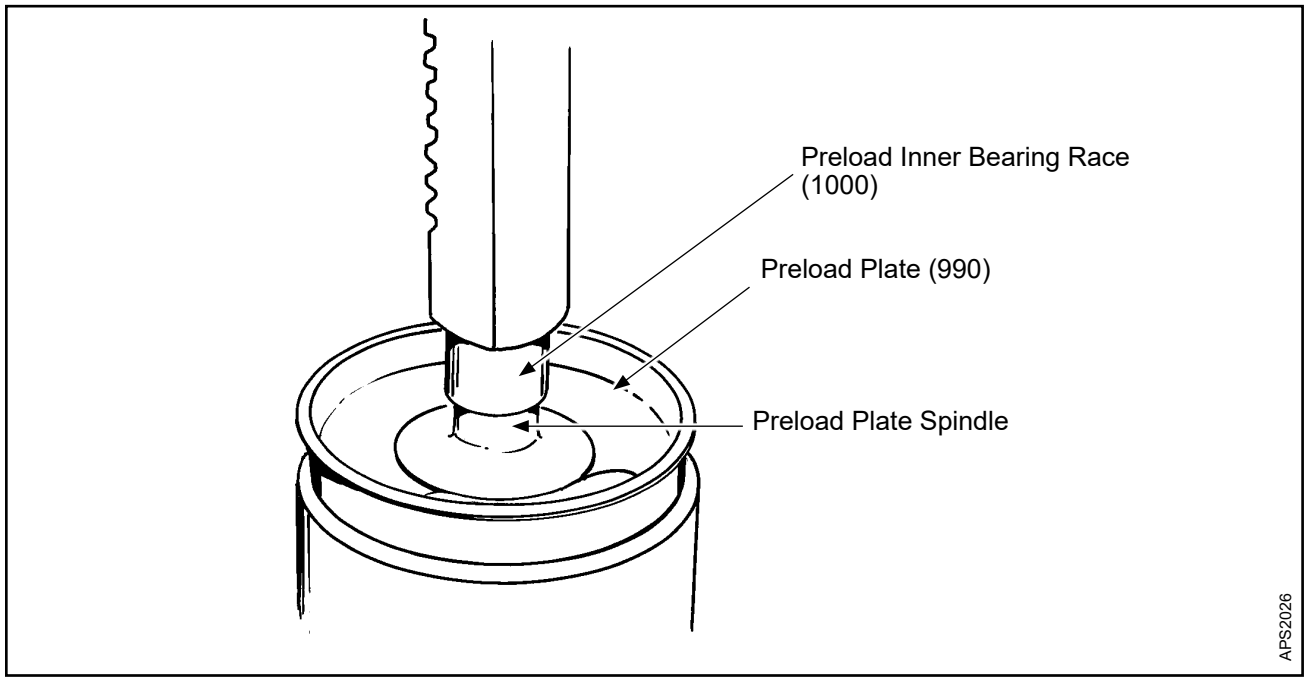
1 The top of the inner bearing race (1000) must be flush to 0.005 inch (0.12 mm) below the top surface of the preload plate spindle.

(g) Turn the set screw (1010) into the preload plate (990) to test the preload plate threads.

1 If the set screw (1010) does not turn smoothly into the preload plate (990), replace the preload plate assembly (980).

(h) Twist, turn, and pull by hand the inner bearing race (1000) to make sure it holds a press fit on the preload plate (990).

1 If the inner bearing race (1000) does not hold a press fit on the preload plate (990), replace the preload plate assembly (980).



Pressing the Preload Bearing onto the Preload Plate Spindle
Figure 6-8

ASSEMBLY - CONTENTS

ASSEMBLY - CONTENTS, CONTINUED

LIST OF FIGURES

LIST OF FIGURES, CONTINUED

LIST OF TABLES

1. General (Rev. 6)

WARNING 1: ANY PART IDENTIFIED IN THIS MANUAL AS AN EXPERIMENTAL OR NON-AVIATION PART MUST NOT BE USED IN AN FAA OR INTERNATIONAL EQUIVALENT TYPE CERTIFICATED PROPELLER. A PART IDENTIFIED AS EXPERIMENTAL OR NON-AVIATION DOES NOT HAVE FAA OR INTERNATIONAL EQUIVALENT APPROVAL EVEN THOUGH IT MAY STILL SHOW AN AVIATION TC OR PC NUMBER STAMP. USE ONLY THE APPROVED ILLUSTRATED PARTS LIST PROVIDED IN THE APPLICABLE OVERHAUL MANUAL OR ADDITIONAL PARTS APPROVED BY AN FAA ACCEPTED DOCUMENT FOR ASSEMBLY OF A PROPELLER. THE OPERATOR ASSUMES ALL RISK ASSOCIATED WITH THE USE OF EXPERIMENTAL PARTS. USE OF EXPERIMENTAL PARTS ON AN AIRCRAFT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

WARNING 2: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF THE BLADE PITCH CHANGE MECHANISM. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE MECHANISM, CAUSING LOSS OF PITCH CONTROL DURING FLIGHT.

A. Important Information

(1) Read all assembly instructions before beginning the assembly procedures.

(2) Protect all unassembled components from damage.

(3) Use applicable torque values. Refer to Table 8-1, "Torque Values", in the Fits and Clearances chapter of this manual.

(4) Unless specified differently, safety wire in accordance with NASM33540 using 0.032 inch (0.81 mm) safety wire.

(5) For information about additional weight slugs that may be required to be attached to the counterweight arms of certain clamp models, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

CAUTION: BEFORE ASSEMBLING THE PROPELLER, DETERMINE IF AN ICE PROTECTION SYSTEM IS REQUIRED.

B. Ice Protection Systems

(1) If installing an ice protection system supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) If installing an ice protection system not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

C. O-rings

(1) Unless specified differently, lubricate all O-rings with lubricant CM12 before installing them in the propeller assembly.

(2) Hartzell Propeller Inc. recommends that the lot number and cure date for each O-ring be recorded with all work orders when an O-ring is installed in any propeller assembly.

D. Blade Bore Plug/Bearing Installation

(1) For aluminum blades, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) For composite blades, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

E. Blade Angle Information

(1) For specific blade angle information, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

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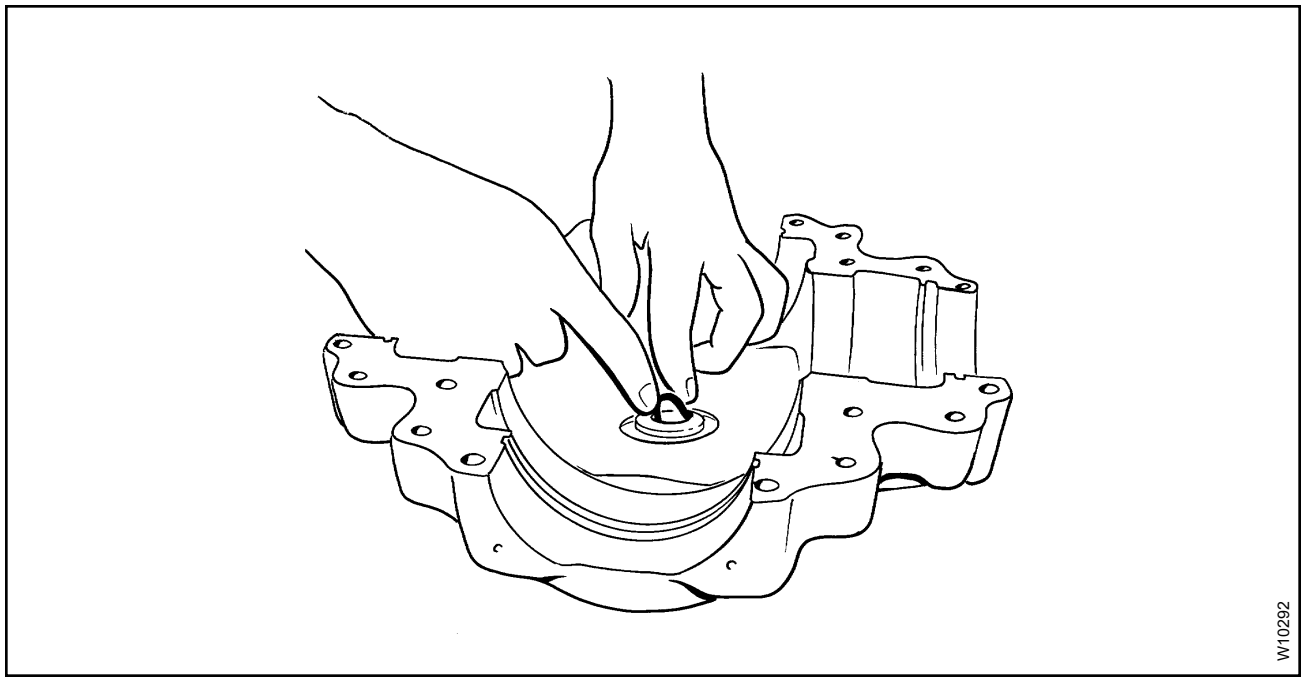
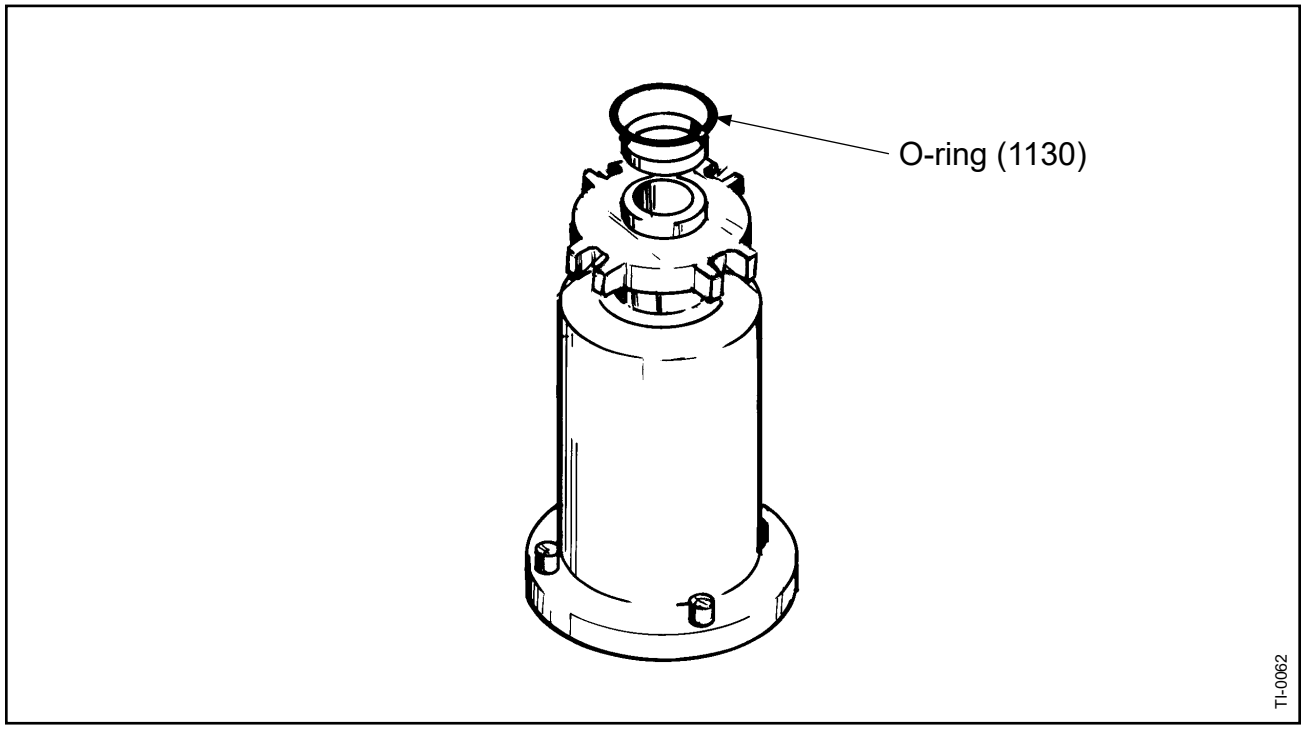


Installing the Pitch Change Rod O-Ring in the Hub Half
Figure 7-1



Installing O-ring on the Rotatable Fixture
Figure 7-2

2. Assembly of HC-( )4A-3( ) Propeller Models

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: ACTUATION OF PROPELLERS IS TO BE ACCOMPLISHED USING COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE, OR NITROGEN.

CAUTION 3: DO NOT EXCEED A PRESSURE OF 200 PSI (13.78 BARS) WHEN ACTUATING PROPELLERS COVERED IN THIS MANUAL.

CAUTION 4: USE SUFFICIENT PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

A. Hub Assembly Procedures

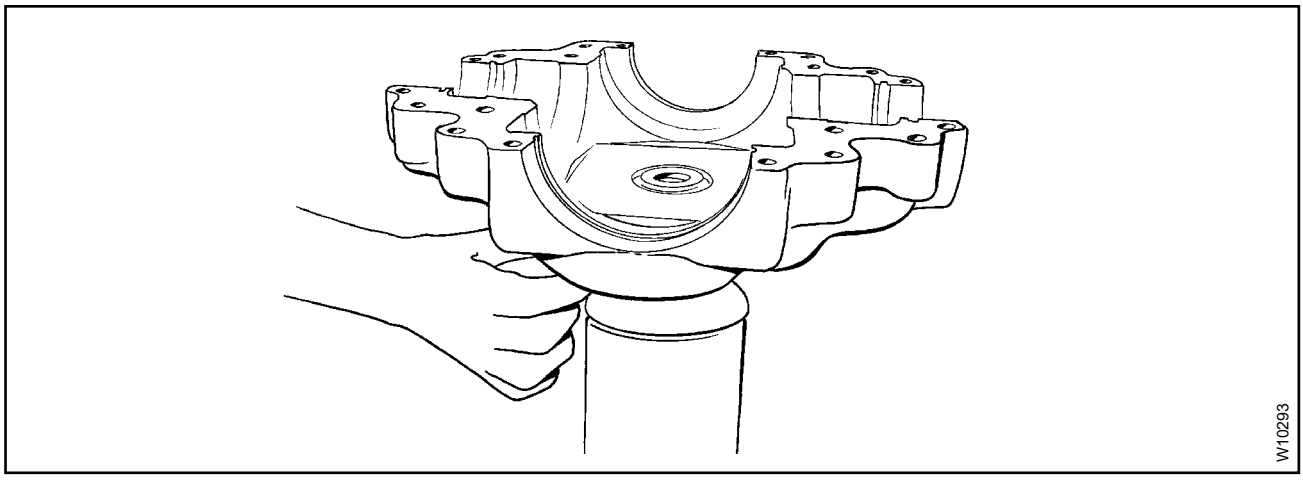
(1) Refer to the Aluminum Hub Overhaul chapter of the Hartzell Standard Practices Manual 202A (61-01-02), for assembly procedures of the hub unit before following the propeller assembly procedures in this manual.

(2) Install a new pitch change rod O-ring (460) in the cylinder-side hub half (450). Refer to Figure 7-1.

(3) Install a new pitch change rod O-ring (560) in the engine-side hub half. Refer to Figure 7-1.

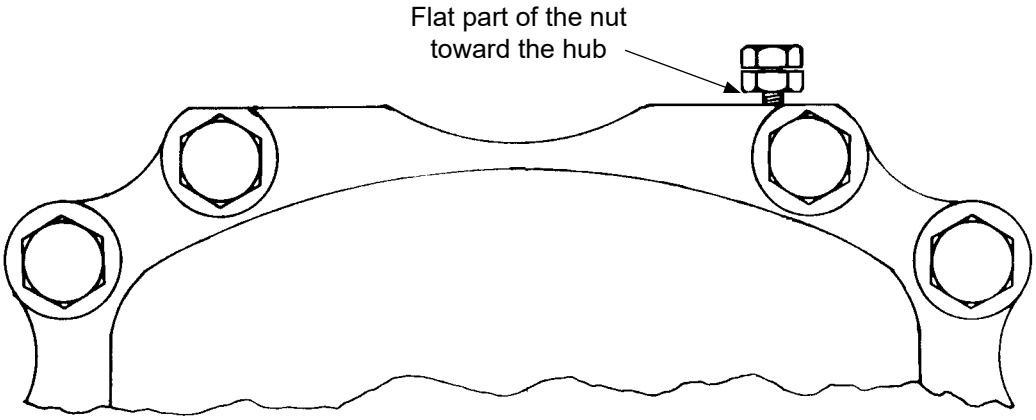
(4) Install the flange O-ring (1130) on the rotatable fixture to seal between the hub and rotatable fixture. Refer to Figure 7-2.

(5) Install and secure the engine-side hub half on the rotatable fixture on the propeller assembly table TE129. Refer to Figure 7-3.

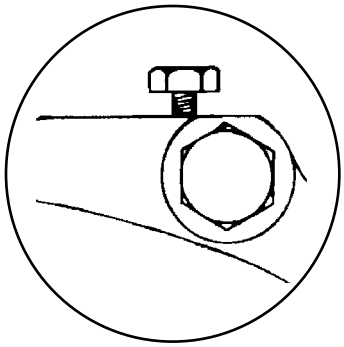


Installing the Engine-Side Hub Half on the Rotatable Fixture
Figure 7-3

Lightning Conductor
Bolt (610) and Nut
(620) Configuration



Engine-Side Hub Half



Lightning Conductor Bolt (610)
Only Configuration

TI-0060A,TI-0061A

Lightning Conductor Bolt
Figure 7-4

CAUTION: THE BOLT GAP IS NECESSARY FOR THE PROPER DISCHARGE OF ANY LIGHTNING CHARGE INTO THE HUB.

(6) Lightning conductor bolt (610) installation [HC-E4A-3(A,I,J)] - Refer to Figure 7-4.

(a) Lightning conductor bolt (610) and nut (620) configuration.

1 Use with the D-5117-1 counterweight clamp only.

2 Install the nut (620) onto the bolt (610) as far as the threads will permit.

NOTE: If the bolt is difficult to start in the nut, turn the nut over, start the bolt in the nut, turn the bolt until one thread of the bolt extends through the nut, and then remove the bolt from the nut. Turn the nut to the correct orientation and install the bolt.

3 Install the bolt (610) with the nut (620) into the balance weight hole in the engine-half of the hub unit.

a Install the bolt in the hole that most closely aligns with the blade trailing edge on the engine-half of the hub unit. Refer to Figure 7-4.

b Insert the bolt as far as the threads will permit.

4 Do not tighten (the bolt will be adjusted after blade installation).

(b) Lightning conductor bolt (610) only configuration.

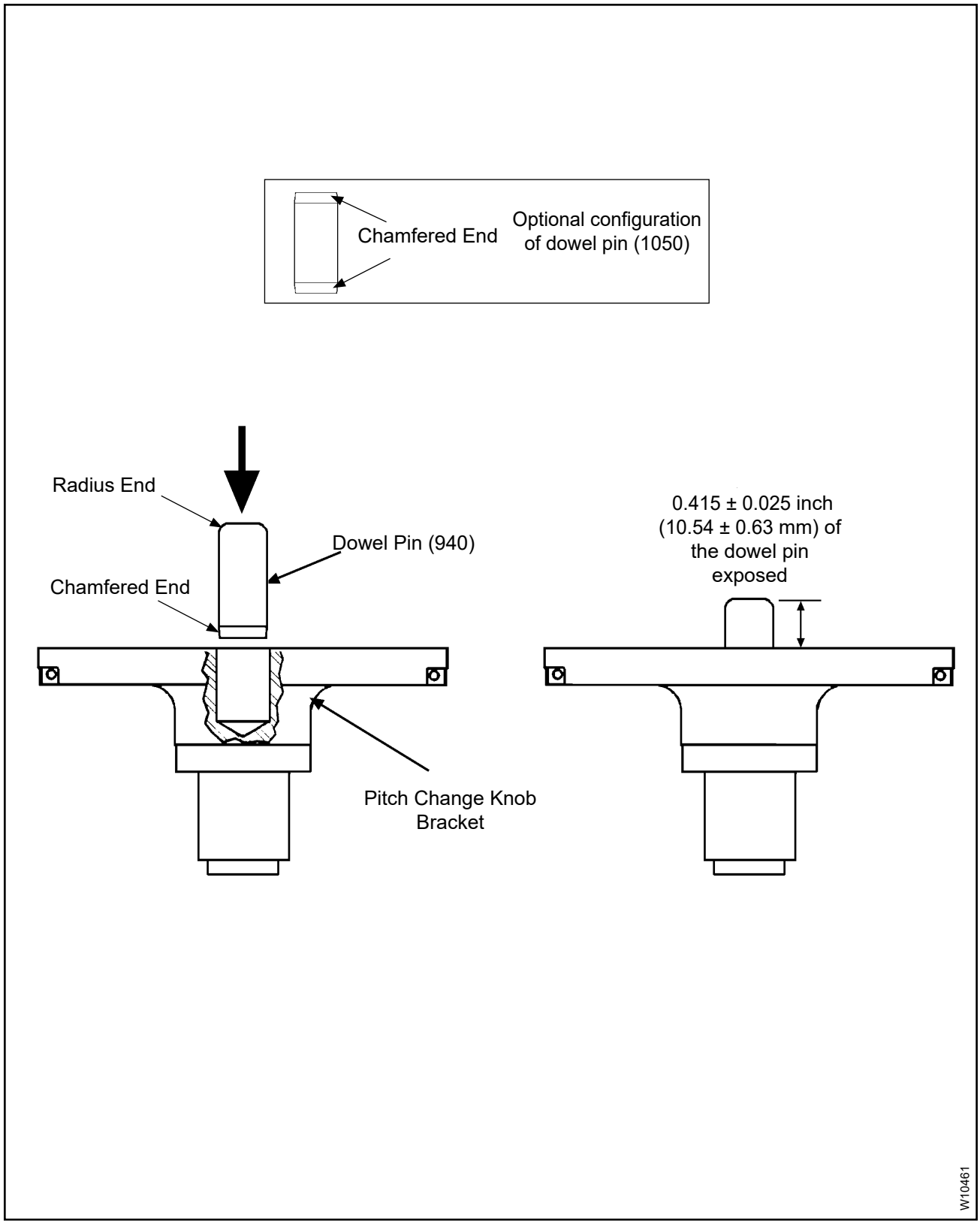
1 Use with the E-7016 counterweight clamp only.

2 Install the bolt (610) into the balance weight hole in the engine-half of the hub unit.

a Install the bolt in the hole that most closely aligns with the blade trailing edge on the engine-half of the hub unit. Refer to Figure 7-4.

b Insert the bolt as far as the threads will permit, but do not tighten.

3 If the lightning conductor bolt (610) is removed for any reason, discard the bolt and replace it with a new bolt.



Installing the Dowel Pin into the Pitch Change Knob Bracket
Figure 7-5

B. Blade Assembly Procedures

(1) General

(a) The following procedure assumes that the blade has been inspected, reworked, and repaired and that the blade bore plug, blade bore bearing, counterweight or counterweight clamp, and blade thrust bearings are installed in accordance with Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33) or Composite Blade Overhaul Manual 135F (61-13-35).

(b) For HC-E4A-3(I,J) Propeller Models Only:

1 E10950PCB blades may replace E10950PB blades either in sets of 2 or 4.

2 E10950PCK blades may replace E10950PK blades either in sets of 2 or 4.

3 Opposing blade pairs in a hub must be of the same model designation.

(2) Installing the Dowel Pin

(a) If the dowel pin (940) has been removed, press the chamfered end of the dowel pin (940) into the pitch change knob bracket (950), leaving 0.415 ± 0.025 inch (10.54 ± 0.63 mm) of the dowel pin exposed. Refer to Figure 7-5.

(3) Lubricating the cam follower (960).

NOTE: The cam followers (960) are shipped from Hartzell Propeller Inc. greased with approved lubricant.

(a) Lubricating of the cam follower (960) is not necessary if one of the following two criteria are met:

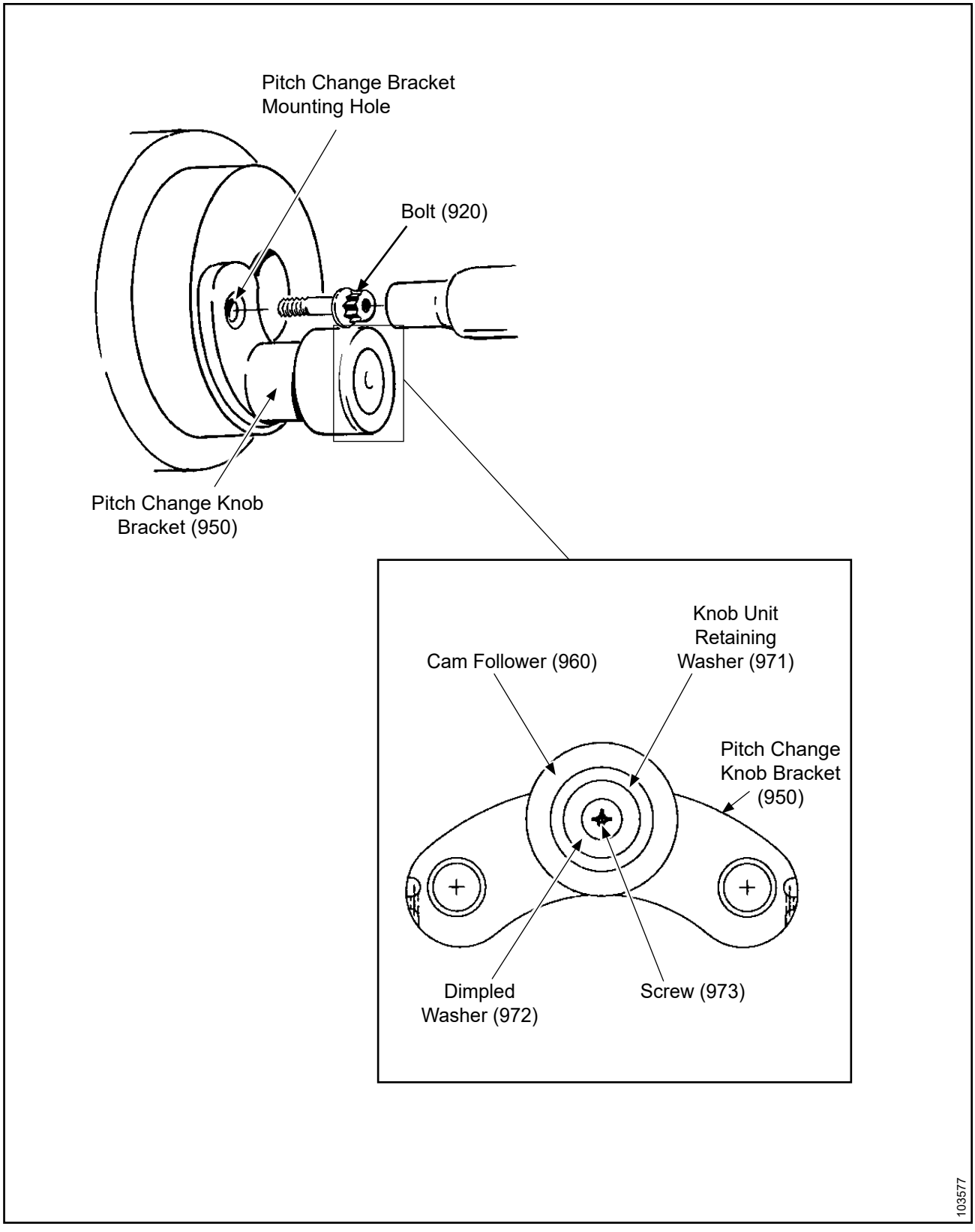
1 It has been less than two years from the date marked on the packaging by Hartzell Propeller Inc.

2 It has been less than 1 year from the date of receipt if there is no date marked on the packaging.

(b) If none of the above criteria are met, complete the following lubrication procedure:

1 Using solvent CM23, flush the grease from the cam follower (960).

2 Using lubricant CM12, lubricate the cam follower (960).



Assembly of the Pitch Change Knob Unit That Uses a Screw
Figure 7-6

(4) For a pitch change knob bracket (950) that uses a screw to retain the cam follower, install the cam follower (960) on the pitch change knob bracket (950), using the following steps. Refer to Figure 7-6.

(a) Using solvent CM106 or CM219, clean the threads of the screw (973) and the threads of the pitch change knob bracket (950).

(b) Permit the solvent CM106 or CM219 to dry.

(c) Apply CM21 Loctite to the clean, dry threads in the top of the pitch change knob bracket (950).

(d) Put the cam follower (960) onto the pitch change knob bracket (950).

(e) With the counterbored side up, put the knob unit retaining washer (971) on the end of the pitch change knob bracket (950).

(f) With the raised side down, put the dimpled washer (972) on the knob unit retaining washer (971).

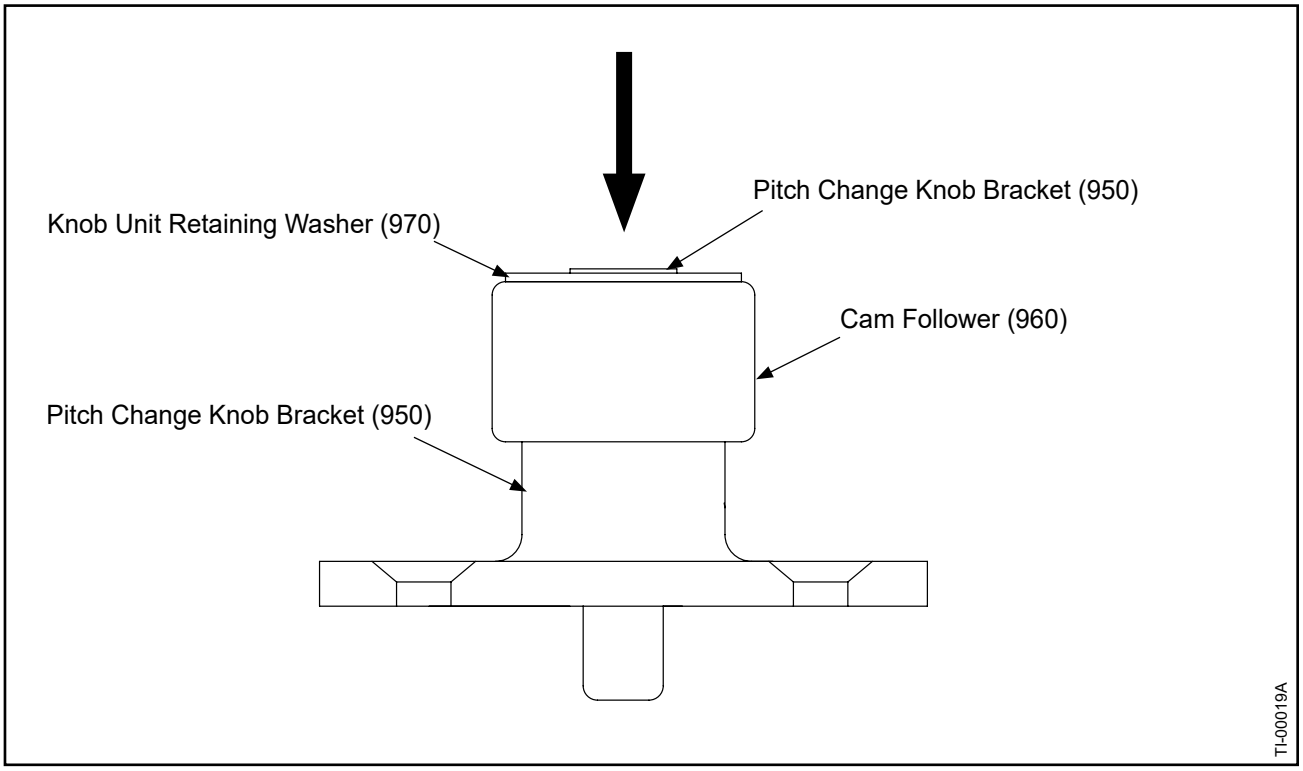
(g) Examine the knob unit retaining washer (971) and the dimpled washer (972) on the pitch change knob bracket (950) to make sure that the parts are seated correctly.

(h) Apply CM21 Loctite to the clean, dry threads of the screw (973).

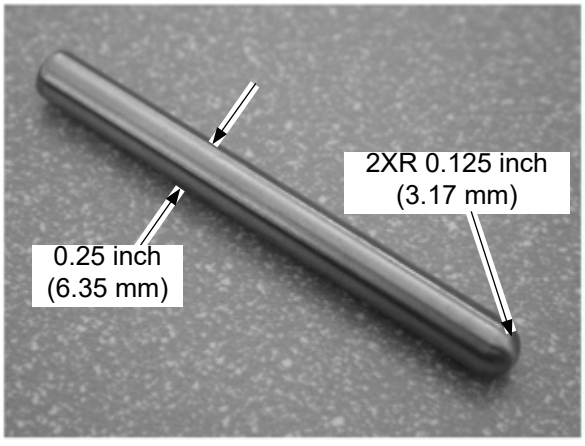
(i) Using the screw (973), attach the knob unit retaining washer (971) and the dimpled washer (972) to the pitch change knob bracket (950).

(j) Torque the screw (973) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(k) Repeat step 2.B.(4)(a) through 2.B.(4)(j) for each of the remaining pitch change knob brackets (950).



Assembly of the Pitch Change Knob Unit That Uses a Swaged Washer
Figure 7-7



Locally Fabricated Swage Tool

Description:
Dowel Pin with a spherical radius tip. Refer to the illustration in this figure.

Material:
A2 tool steel
hardened to 55-62 HRC
(recommended)

TI-00100

Swage Tool
Figure 7-8

(5) For a pitch change knob bracket that uses a swaged washer to retain the cam follower, install the cam follower (1040) on the pitch change knob bracket (1020) using the following steps:

(a) Slide the cam follower (960) onto the pitch change knob bracket (950). Refer to Figure 7-7.

CAUTION: PRESS THE KNOB UNIT RETAINING WASHER, COUNTERSUNK SIDE DOWN, EVENLY AGAINST THE SHOULDER OF THE PITCH CHANGE KNOB BRACKET. THE KNOB UNIT RETAINING WASHER MUST BE COMPLETELY SEATED ON THE PITCH CHANGE KNOB BRACKET.

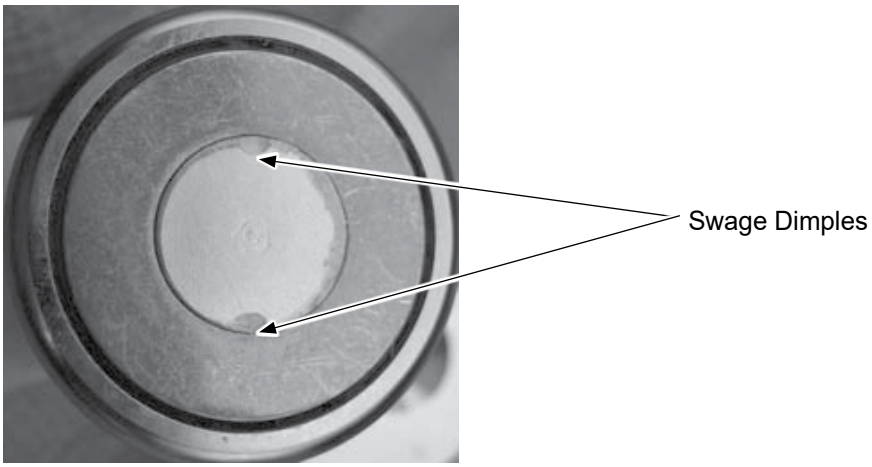
(b) Press the washer (970), bevel down, onto the top of the pitch change knob bracket (950). Refer to Figure 7-7.

1 The knob unit retaining washer (970) is completely seated on the pitch change knob bracket (950) when the pitch change knob bracket extends slightly through the top of the knob unit retaining washer. Refer to Figure 7-7.

(c) Swage the end of the pitch change knob bracket (950).

CAUTION: DIMPLES CAUSED BY SWAGING MUST NOT CONTACT PREVIOUS DIMPLES. THERE MUST BE AN UNSWAGED AREA BETWEEN THE CENTER OF PREVIOUS SWAGE HITS.

1 Using sufficient force and a locally fabricated swage tool, swage the end of the pitch change knob bracket (950) in two places that are 120-180 degrees apart to force a small amount of material over the edge of the knob unit retaining washer (970). Refer to Figure 7-8 and Figure 7-9.



Swaged Pitch Change Knob Bracket
Figure 7-9

(d) After assembly of the parts, perform the following pull test:

1 Hold the pitch change knob bracket (950) firmly in one hand.

2 Grip the cam follower (960) firmly in the other hand.

3 Firmly pull on the cam follower (960) to test the integrity of the knob unit retaining washer's interference fit and the swaging to the pitch change knob bracket (950).

4 If the knob unit retaining washer (970) remains firmly in position on the pitch change knob bracket (950), perform the turn test in step 2.B.(5)(e).

5 If the knob unit retaining washer (970) does not remain firmly in position on the pitch change knob bracket (950), perform the following:

a Discard the knob unit retaining washer (970).

b Reassemble a pitch change knob bracket (950), a cam follower (960), and a new knob unit retaining washer (970), using new or overhauled parts as necessary, in accordance with the applicable steps in this manual. Swage the pitch change knob bracket in accordance with Paragraph 2.B.(5)(c).

c Repeat the pull test in accordance with Paragraph 2.B.(5)(d).

d If the knob unit retaining washer (970) does not remain firmly in position on the pitch change knob bracket (950), measure the diameter of the knob unit retaining surface of pitch change knob bracket. If the OD is less than the serviceable limits as specified in the Check chapter of this manual, discard the pitch change knob bracket.

e Report to Hartzell Propeller Inc. each occurrence of a pitch change knob bracket (950) that is less than the serviceable limits specified.

(e) After assembly of the parts, perform the following turn test:

1 Grip and turn the cam follower (960) on the pitch change bracket (950).

a If the cam follower (960) turns freely on the pitch change bracket (950), continue the propeller assembly process.

b If the cam follower (960) does not turn freely on the pitch change bracket (950), replace the cam follower in accordance with steps 2.B.(5)(a) through 2.B.(5)(d). Repeat the pull test and the turn test until the results are satisfactory.

(f) Repeat step 2.B.(5)(a) through B.(5)(e) for each of the remaining pitch change knob brackets (950).

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TPI-MB-0618
TPI-143A-W10555B
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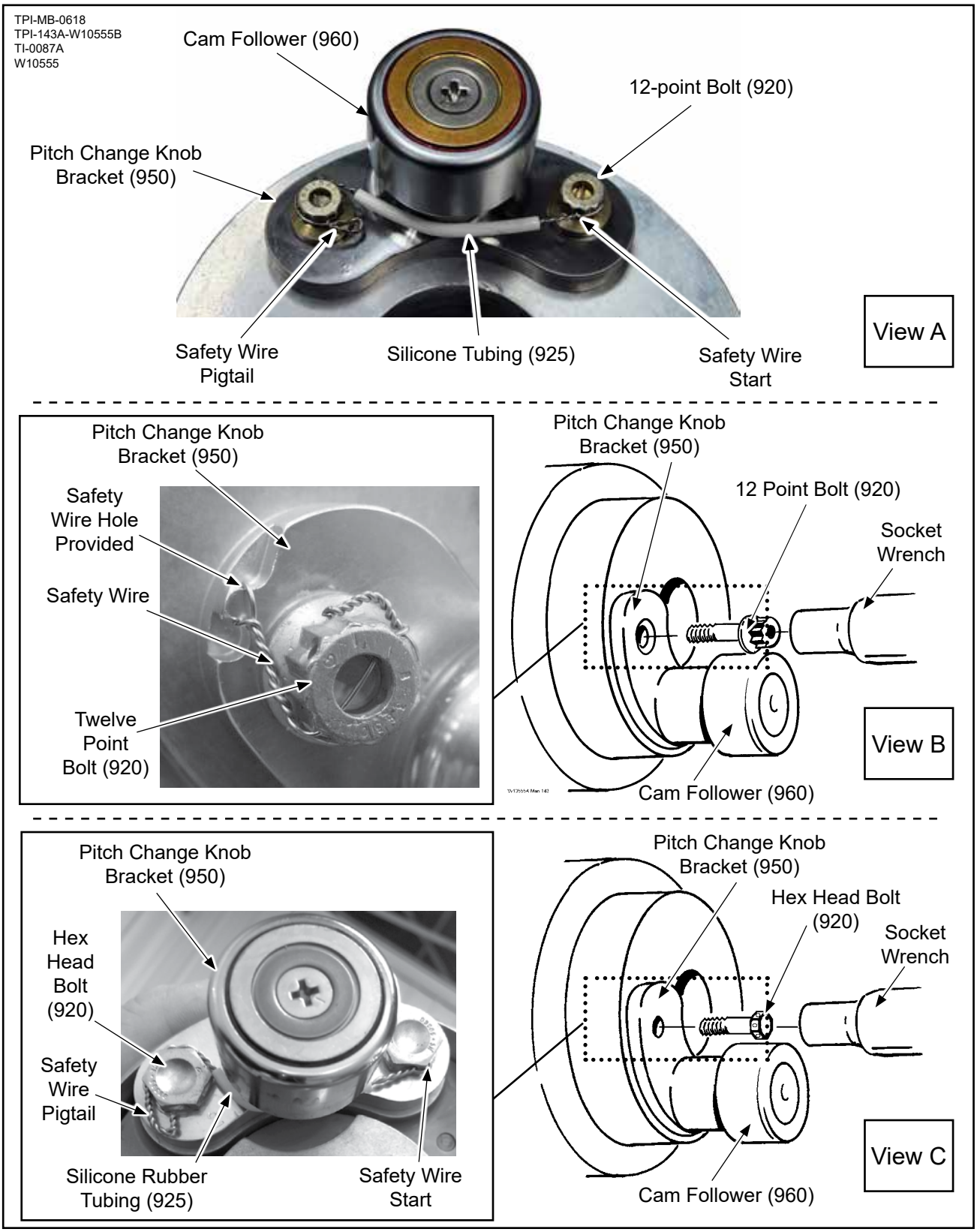
W10555



Attaching the Pitch Change Knob Bracket
Figure 7-10

(6) Installation of the Pitch Change Knob Unit - Refer to Figure 7-10

(a) Make sure that the butt of the blade and the pitch change knob unit (930) surfaces are clean and free of oil, dirt, and other foreign materials.

(b) Put the pitch change knob unit (930) on the butt of the blade.

(c) Line up the holes in the pitch change knob unit (930) with the threaded holes in the butt of the blade.

(d) Using a mallet, tap the pitch change knob bracket (950) until it is firmly against the butt of the blade.

1 Use the alternate pitch change knob unit (930) choices as necessary to bring the floating pitch angle of all four blades within the specified tolerance of ±0.1 degree. Refer to the pitch change knob unit selection data in Table 7-1.

(e) **For propeller models HC-( )4A-3( ) except HC-E4A-3(A,I,J)**:

1 Refer to Figure 7-10, View A.

2 Install the 1/4-28 12 point bolts (920).

3 Torque each bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Using rubber silicone tubing (925) if applicable, safety wire the bolts (920) in accordance with NASM33540.

(f) **For propeller models HC-E4A-3(A,I,J)**:

1 Refer to Figure 7-10, View B.

2 Install the 12 point bolts (920).

3 Torque each bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Safety wire the bolts (920) to the hole in the pitch change knob bracket (950) in accordance with NASM33540.

(g) **For propeller models that use 5/16-24 hex head bolts (920) to attach the pitch change knob unit (930) to the butt of the blade**:

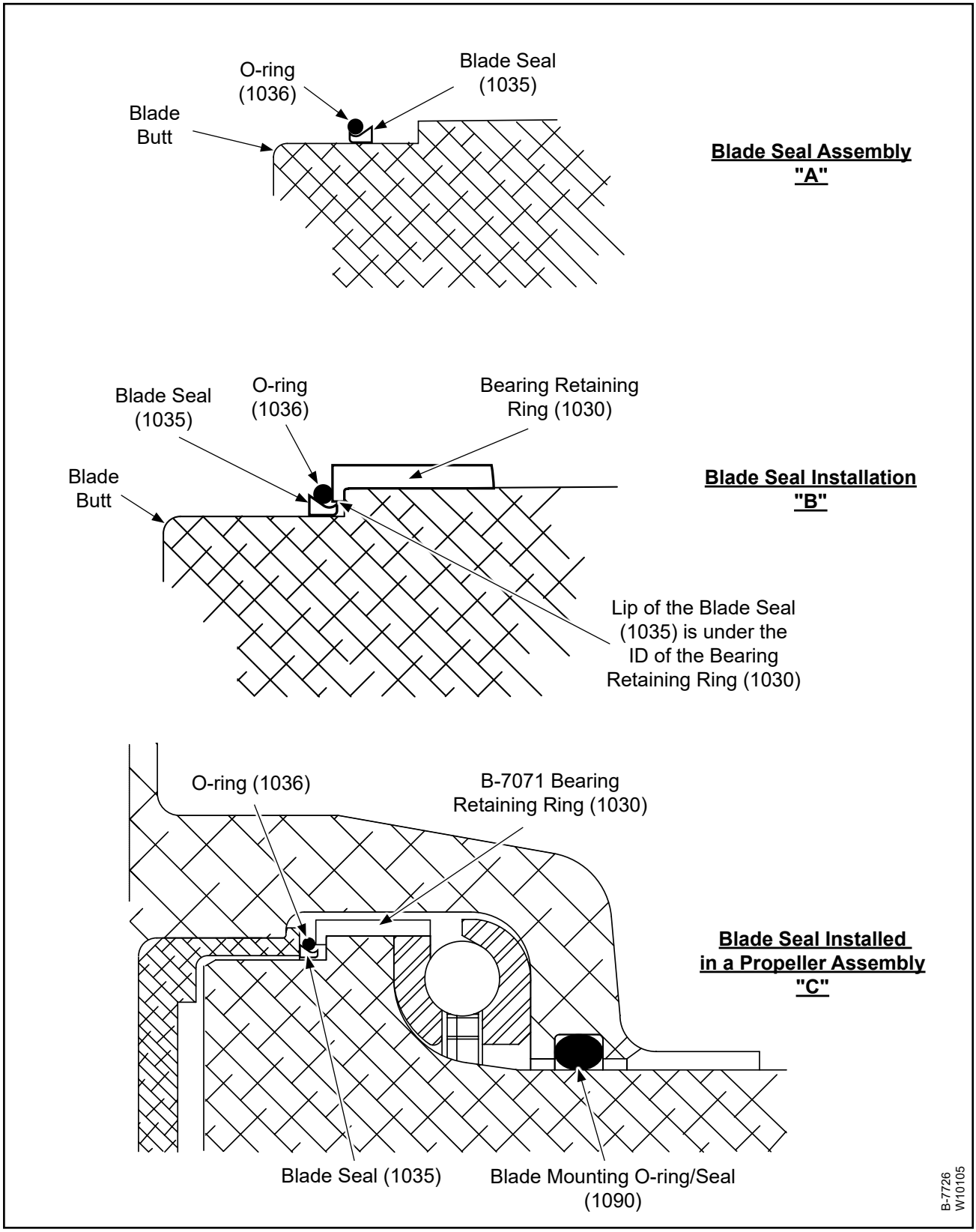
1 Refer to Figure 7-10, View C.

2 Install the 5/16-24 hex head bolts (920).

3 Torque each bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Using rubber silicone tubing (925) if applicable, safety wire the bolts (920) to each other in accordance with NASM33540.

(h) Repeat the applicable steps 2.B.(6)(a) through 2.B.(6)(g) for the remaining blades.



Blade Seal Installation for E-Shank Blades
Figure 7-11

(7) Blade Seal Assembly Installation, E-shank blades only - Optional

CAUTION: THE B-7071 BEARING RETAINING RING MUST BE INSTALLED WHEN USING THIS BLADE SEALING METHOD.

(a) Assemble the blade seal (1035) and O-ring (1036). Refer to Figure 7-11, "A".

CAUTION: DO NOT OVER STRETCH OR TWIST THE BLADE SEAL DURING INSTALLATION.

1 Install the blade seal (1035) on the butt of the blade with the recessed area of the blade seal facing away from the bearing retaining ring (1030). If the blade seal stretches, replace the blade seal.

NOTE: Initially installing the blade seal with the recessed area facing away from the bearing retaining ring will make it easier to install the O-ring onto the blade seal. An optional method may be to pre-assemble the blade seal assembly on an unserviceable blade butt, or equivalent fixture.

2 Install the O-ring (1036) into the recessed area of the blade seal (1035). If the O-ring does not remain in place, replace the blade seal.

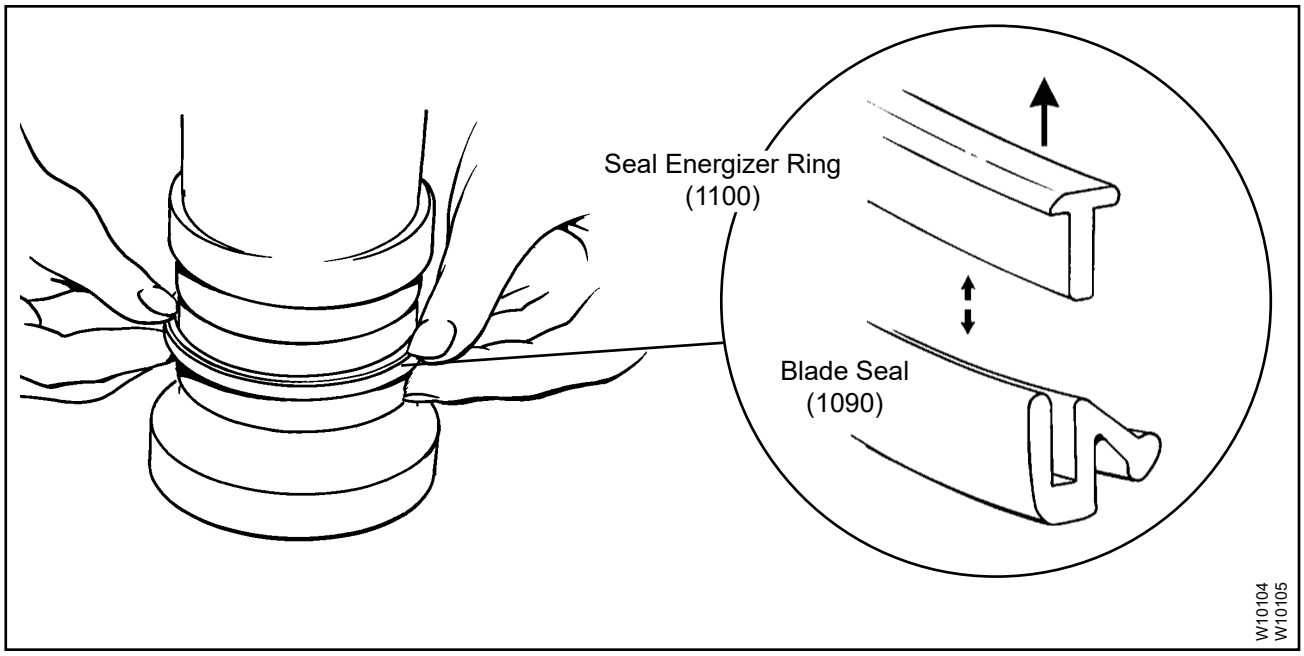
3 Remove the blade seal assembly from the butt of the blade.

CAUTION 1: DO NOT DEFORM THE BLADE SEAL ASSEMBLY WHEN INSTALLING THE BLADE SEAL AND O-RING ASSEMBLY ONTO THE BLADE.

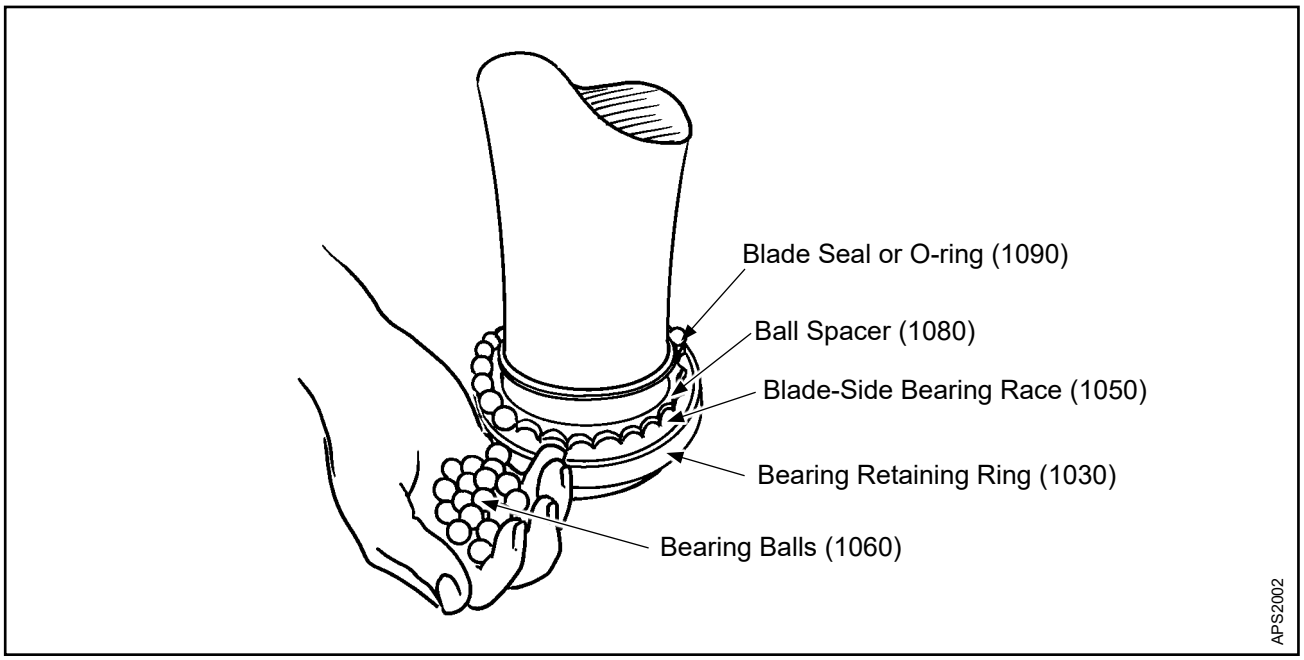
CAUTION 2: THE CORRECT INSTALLATION OF THE BLADE SEAL ASSEMBLY IS CRITICAL TO THE SEAL FUNCTION AND BLADE ROTATION.

(b) Reinstall the blade seal assembly onto the butt of the blade with the recessed area facing the bearing retaining ring (1030). Refer to Figure 7-11, "B".

1 The seal assembly must slide easily into position on the blade butt.



Installing the Blade Seal onto the Blade
Figure 7-12



Installing the Blade Bearing Balls
Figure 7-13

(8) **For HC-( )4A-3( ) except HC-E4A-3(A,I,J)**: Install the blade O-ring (1090). Refer to Figure 7-11, "C".

(a) Using lubricant CM12, lubricate the blade O-ring (1090).

(b) Install the blade O-ring (1090) over the base of the blade shank.

(9) **For HC-E4A-3(A,I,J)**:

(a) When using the blade seal (1090) and energizer ring, use the following steps;

CAUTION: THE BLADE SEAL MUST BE INSTALLED SO THAT THE GROOVE PROVIDED FOR THE ENERGIZER RING IS FACING TOWARD THE TIP OF THE BLADE.

1 Install the blade seal (1090) over the base of the blade shank. Refer to Figure 7-12.

2 Apply a small amount of lubricant CM12 in the groove of the blade seal (1090) provided for the energizer ring (1100).

(b) When using the blade O-ring (1090), use the following steps;

1 Using lubricant CM12, lubricate the blade O-ring (1090).

2 Install the blade O-ring (1090) over the base of the blade shank.

(10) Installation of the Hub-Side Bearing Race and Bearing Balls - Refer to Figure 7-13.

(a) Using lubricant CM12, lubricate the blade-side bearing race (1050).

(b) Put the ball spacer (1080) on the blade-side bearing race (1050).

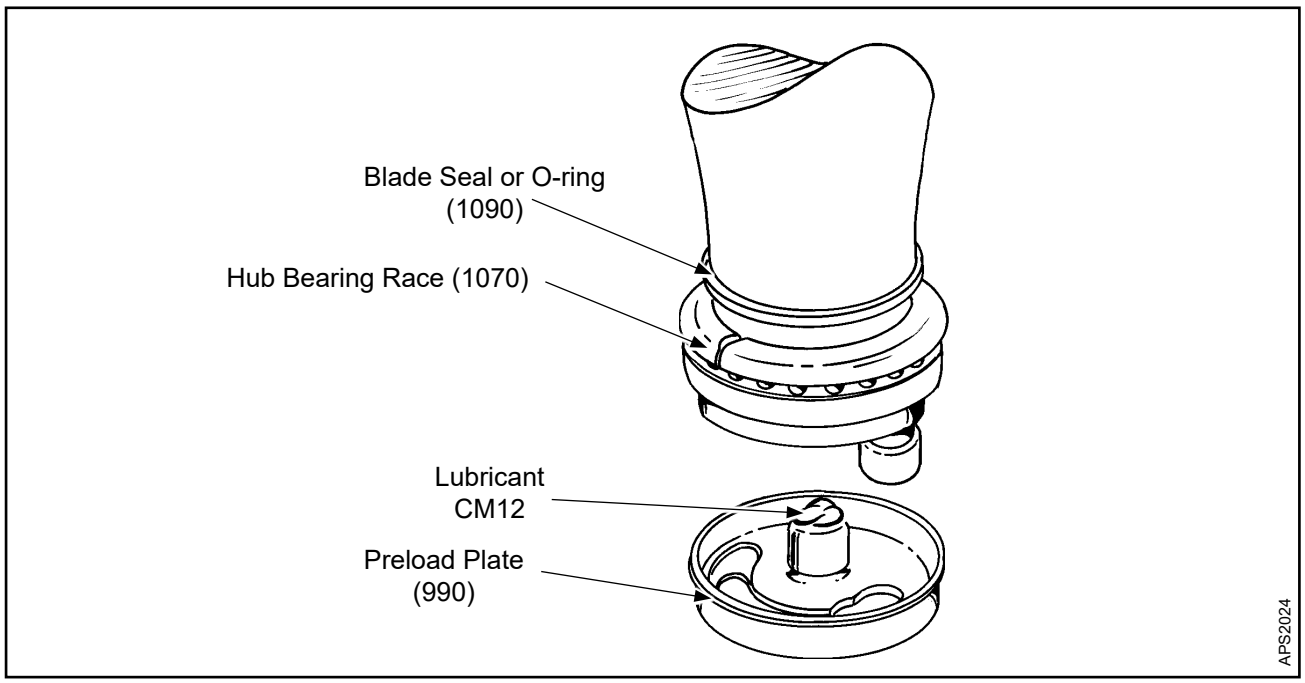
CAUTION: ALL BEARING BALLS INSTALLED IN A SINGLE BEARING MUST BE OF THE SAME GAUGE. BEARING BALLS SUPPLIED BY HARTZELL ARE OF THE SAME GAUGE.

(c) Put the bearing balls (1060) in the openings of the ball spacer (1080) on the blade-side bearing race (1050).

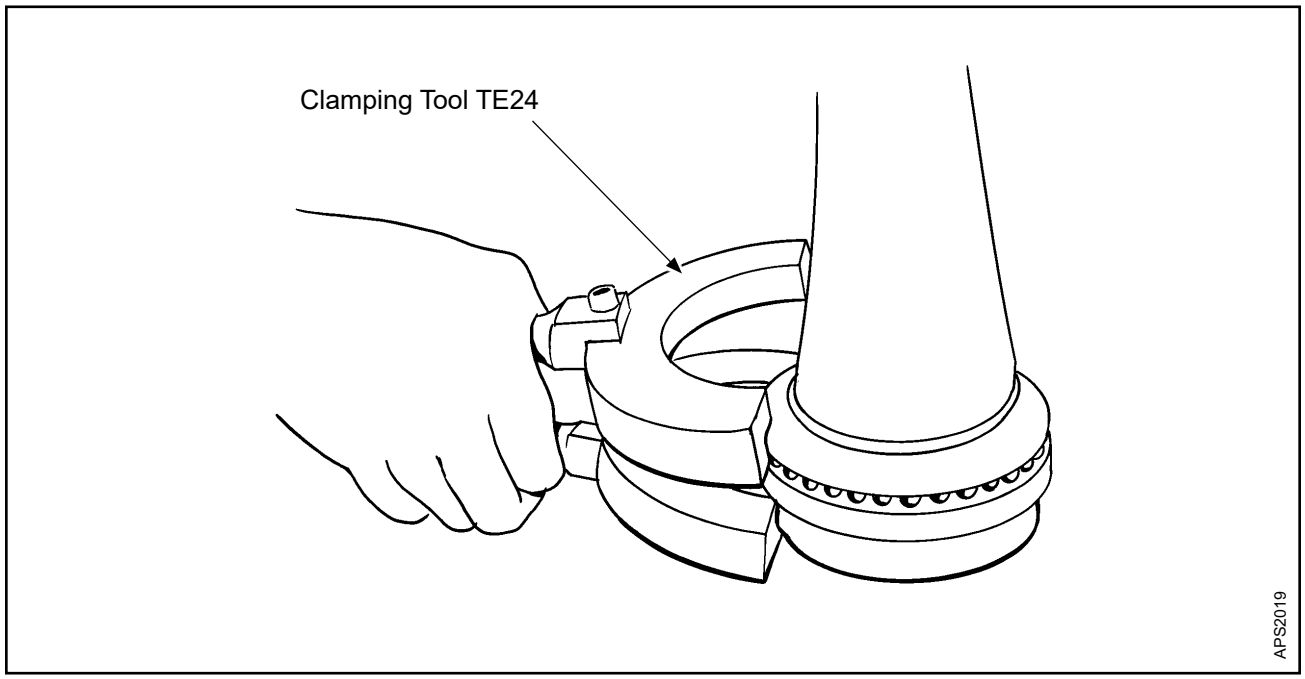
CAUTION: THE BEARING RACE HALVES MUST HAVE MATCHING SERIAL NUMBERS.

(d) Place the hub-side bearing race (1070) on the bearing balls (1060) Refer to Figure 7-14.

1 Install the hub-side bearing race with the parting line perpendicular to the hub parting line when installed in the hub. Refer to Figure 7-16.



Installing the Preload Plate on the Blade Shank
Figure 7-14



Applying the Clamping Tool TE24 to the Blade Assembly
Figure 7-15

C. Preload Plate Assembly

(1) Install the set screw (1010) in the preload plate (990) so the end of the set screw protruding toward the blade butt is flush with the preload plate.

NOTE: The set screw will be repositioned later to set the blade preload.

(2) Install the nut (1020) on the set screw (1010) and position the nut a short distance from the preload plate.

NOTE: Thread locking compound will be applied to the set screw (1010) between the nut (1020) and the preload plate (990) later in the build process.

(3) For all propellers except HC-E4A-3(A,I,J): Put approximately one tablespoon of lubricant CM12 on top of the preload plate inner bearing ring to lubricate the blade bore bearing. Refer to Figure 7-14.

NOTE 1: Using this amount of lubricant will force lubrication into the blade bore bearing when the preload plate is installed on the blade.

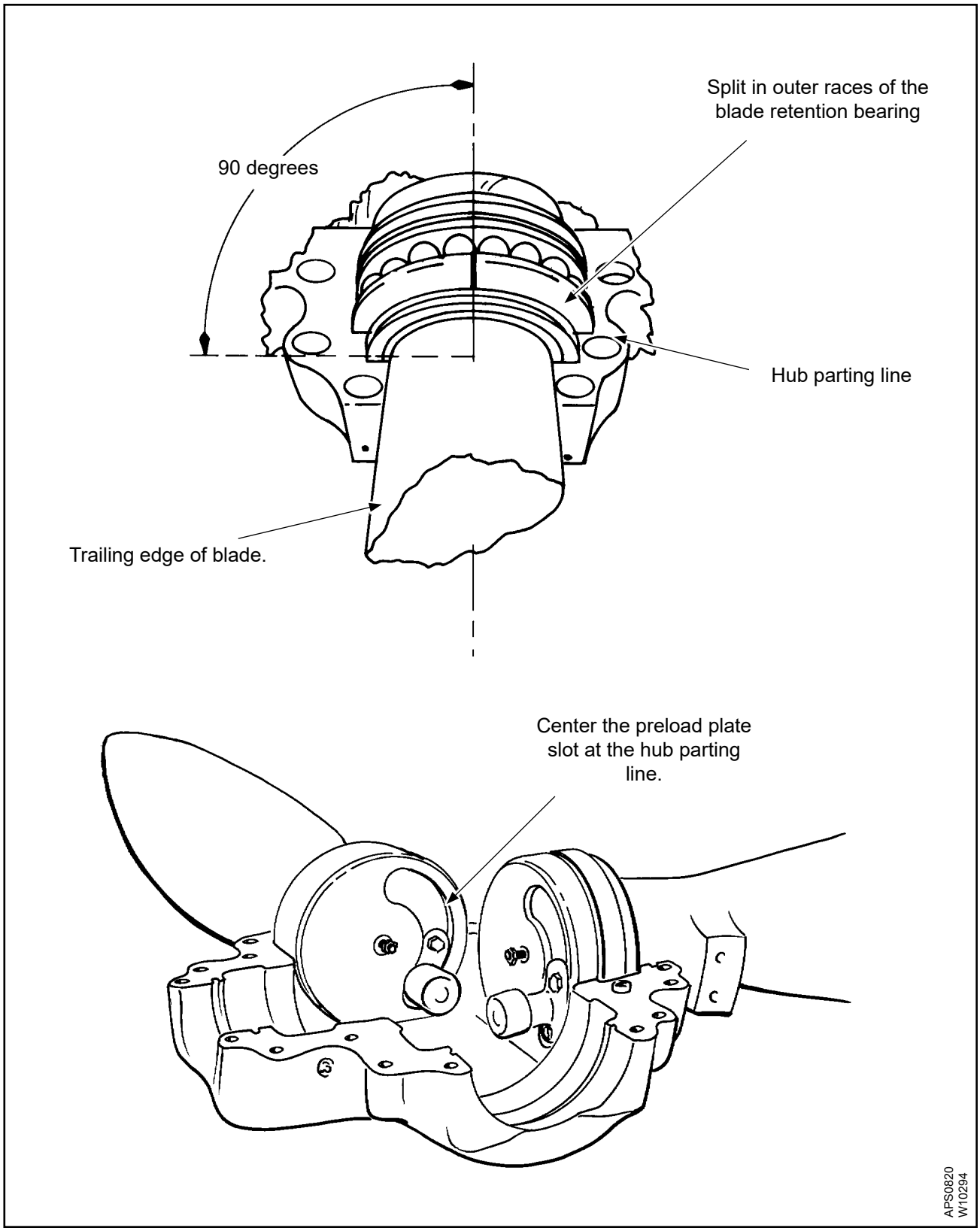
NOTE 2: HC-E4A-3(A,I,J) propellers do not require lubrication of the blade bore bearing because the preload plate does not have the blade bore inner bearing ring installed.

CAUTION: THE SPLIT-BEARING RACE PARTING LINE MUST BE PERPENDICULAR TO THE HUB PARTING LINE WHEN INSTALLED IN THE HUB. REFER TO FIGURE 7-16.

(4) Install the preload plate (990) on the butt of the blade. Refer to Figure 7-14.

NOTE: If desired, to ease installation of the blade into the hub, hold the split bearing and preload plate assembly to the blade butt with the clamping tool TE24. Refer to Figure 7-15.

(5) Repeat the blade and preload plate assembly procedures for the remaining three blades.



Installing a Blade in the Hub Socket
Figure 7-16

D. Blade Installation

(1) For propeller model HC-E4A-3J:

(a) Either E10950P( ) or E10950PC( ) blade models can be installed.

(b) Both blade designs can also be used in pairs in the same propeller if the blades in each pair are installed opposite each other.

(2) Apply a thin film of lubricant CM12 to the hub blade retention radii of the hub and hub O-ring grooves.

CAUTION: BLADES MUST BE PRELOADED WHILE RESTING IN THE HUB SOCKET THEY WILL OCCUPY WHEN ASSEMBLED. DO NOT PRELOAD ALL THE BLADES IN THE SAME SOCKET.

(3) Install blade number one and blade number two assemblies into the sockets of the engine-side hub half. Refer to Figure 7-16.

(4) Center the slot of the preload plate (990) at the hub parting line. Refer to Figure 7-16.

(a) Position the blade knob slot in the preload plate to permit the blade to travel within the full blade angle range without restriction.

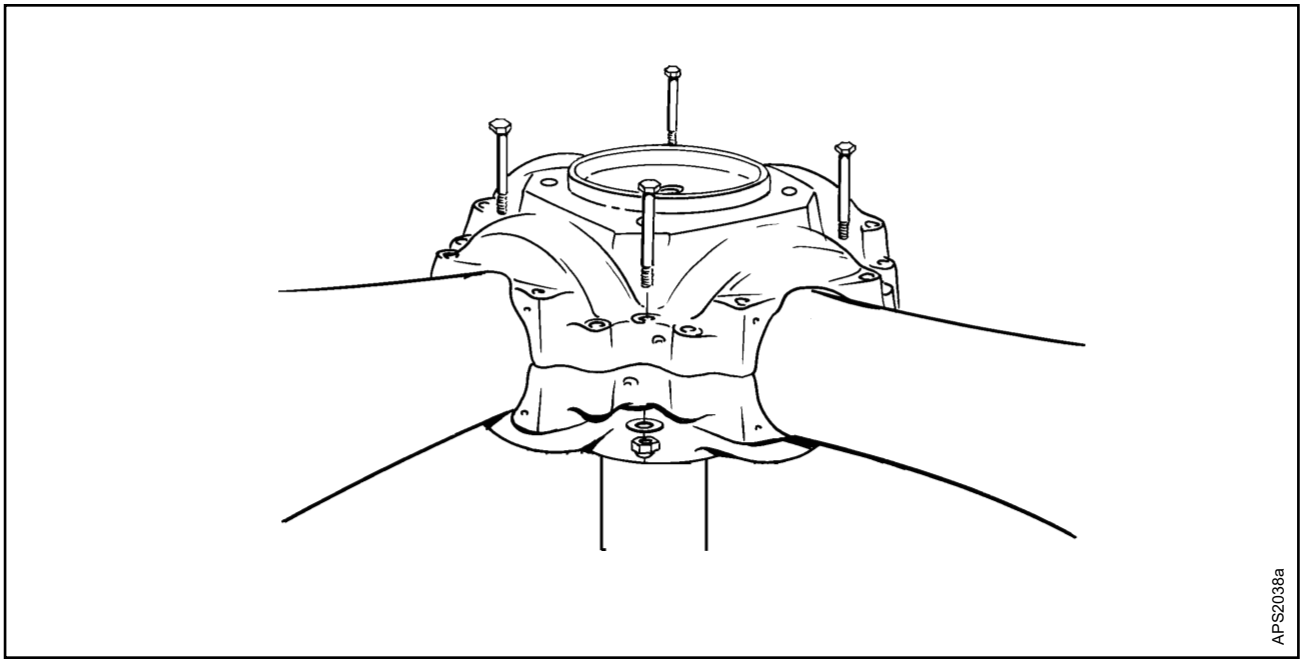
CAUTION: IMPROPER PRELOAD CAN CAUSE THE BLADES TO BE LOOSE IN THE HUB OR MAY EXERT EXCESSIVE PRESSURE THAT CAN INTERFERE WITH PITCH CHANGE MOVEMENT.

(5) Setting the blade preload.

(a) Install the cylinder-side hub half. Refer to Figure 7-17.

(b) Bolt the hub halves together using four hex head bolts (570), four washers (590), and four self-locking nuts (600) located midway between the blades. Refer to Figure 7-17.

(c) Torque the self-locking nuts (600) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.



Installing the Cylinder-Side Hub Half to Set Preload
Figure 7-17

(d) On blade number one, tighten the preload set screw (1010) through the open end of the hub. Refer to Figure 7-18.

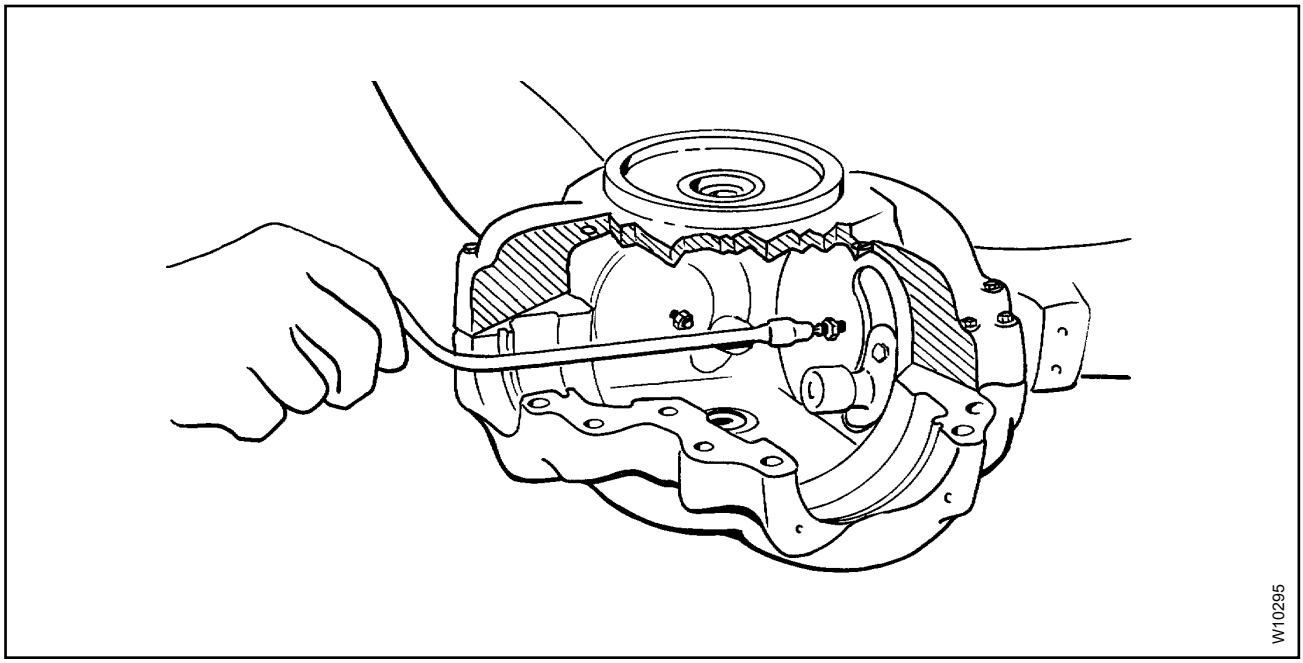
NOTE: The loose blade will become rigid in the hub as the set screw is tightened.

(e) Tighten the preload set screw (1010) until the tip of the blade stops moving vertically.

(f) Gently push on the tip of the blade to make sure the blade is properly seated in the retention socket.

(g) Loosen the preload set screw (1010) and retighten.

1 When the blade tip stops moving, turn the preload set screw (1010) approximately 1/4 to 1/2 additional turn into the preload plate (990).



Tightening Preload Plate Set Screw and Thin Hex Nut
Figure 7-18

(h) Check the blade for free rotation. If the blade is not free, check the following:

1 Blade seal (1090) for proper fit in the hub groove.

2 The needle rollers in the blade bore bearing may be skewed. The needle rollers should be parallel to the axis of blade pitch change.

3 Blade preload may be too tight.

(i) Repeat the preload setting procedure on blade number two.

(j) Remove the four bolts (570), four washers (590), and four nuts (600).

(k) Remove the cylinder-side hub half (450).

(l) Apply one drop of thread locking compound CM21 on the threads of the preload set screws (1010) between the thin hex nut (1020) and the preload plate (990).

CAUTION: MAKE SURE TO PREVENT THE SET SCREW (1010) FROM ROTATING WHEN TORQUING THE THIN HEX NUT (1020).

(m) Torque the thin hex nuts (1020) against the preload plate (990) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(6) Using clamping tool TE24, if desired, remove blades one and two from the hub.

CAUTION: THE PARTING LINE OF THE SPLIT BEARING RACE CONTACTING THE HUB MUST BE PERPENDICULAR TO THE HUB PARTING SURFACE WHEN INSTALLED IN THE HUB.

(7) Install blades three and four in the hub and set the blade preload.

(a) Set the preload for blades three and four following the same blade installation and preload setting procedures as prescribed for blades one and two.

(8) Reinstalling blades one and two.

CAUTION: THE PARTING LINE OF THE SPLIT BEARING RACE CONTACTING THE HUB MUST BE PERPENDICULAR TO THE HUB PARTING SURFACE WHEN INSTALLED IN THE HUB.

(a) Using clamping tool TE24, if desired, install blade two into the engine-side hub half.

(b) Center the slot of the preload plate (990) at the hub parting line. Refer to Figure 7-16.

(c) Position the pitch change knob unit in the preload plate to permit the blade to travel the full blade angle range without restriction.

CAUTION: HC-E4A-3(A,I,J) PROPELLER MODELS DO NOT CONTAIN A BLADE BORE INNER BEARING RING ON THE PRELOAD PLATE. MAKE SURE WHEN ROTATING THE BLADES THAT THE BLADE(S) DOES NOT JUMP OUT OF THE BLADE SOCKET.

(d) Move the three blades into full reverse position.

(e) Apply thread lock CM74 to the threads of each bumper extension (690).

(f) Install the bumper extensions (690) onto the pitch change fork (680) and torque each bumper extension in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(g) Install a fork bumper (700) on each bumper extension (690).

1 Using a plastic mallet, tap the fork bumper (700) into the hole in the bumper extension (690).

NOTE: The fork bumper (700) nipple is an interference fit with the hole in the bumper extension (690).

(h) Apply anti-seize compound CM118 to the fork threads.

CAUTION: MAKE SURE THAT THE TAPER IN THE CENTER THREADED HOLE OF THE FORK UNIT (680) IS FACING TOWARD THE CYLINDER HUB HALF TO PROPERLY FIT ONTO THE PITCH CHANGE ROD (420) THAT WILL BE INSTALLED LATER.

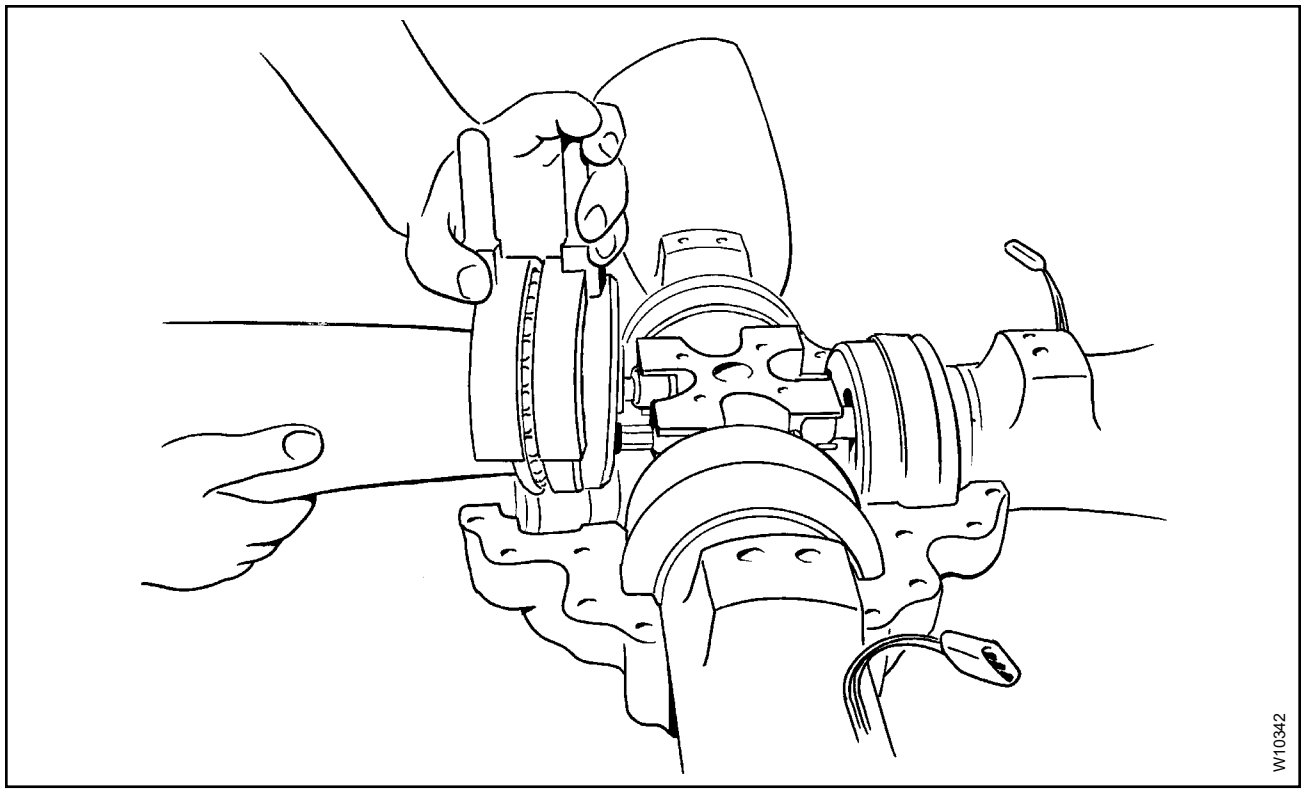
(i) Install the fork (680) by positioning the fork slots around the pitch change knobs of the blades.

(j) Reinstall blade number one. Refer to Figure 7-19.

1 Insert the pitch change knob in the fork (680) slot, then lower the blade and blade retention bearing into the hub.

(k) Position the center of the each slot in the preload plate on the plane of the parting line of the hub.

1 Position the blade knob slot in the preload plate to permit the blade to travel within the full blade angle range without restriction.



Reinstalling Blade Number One in the Hub
Figure 7-19

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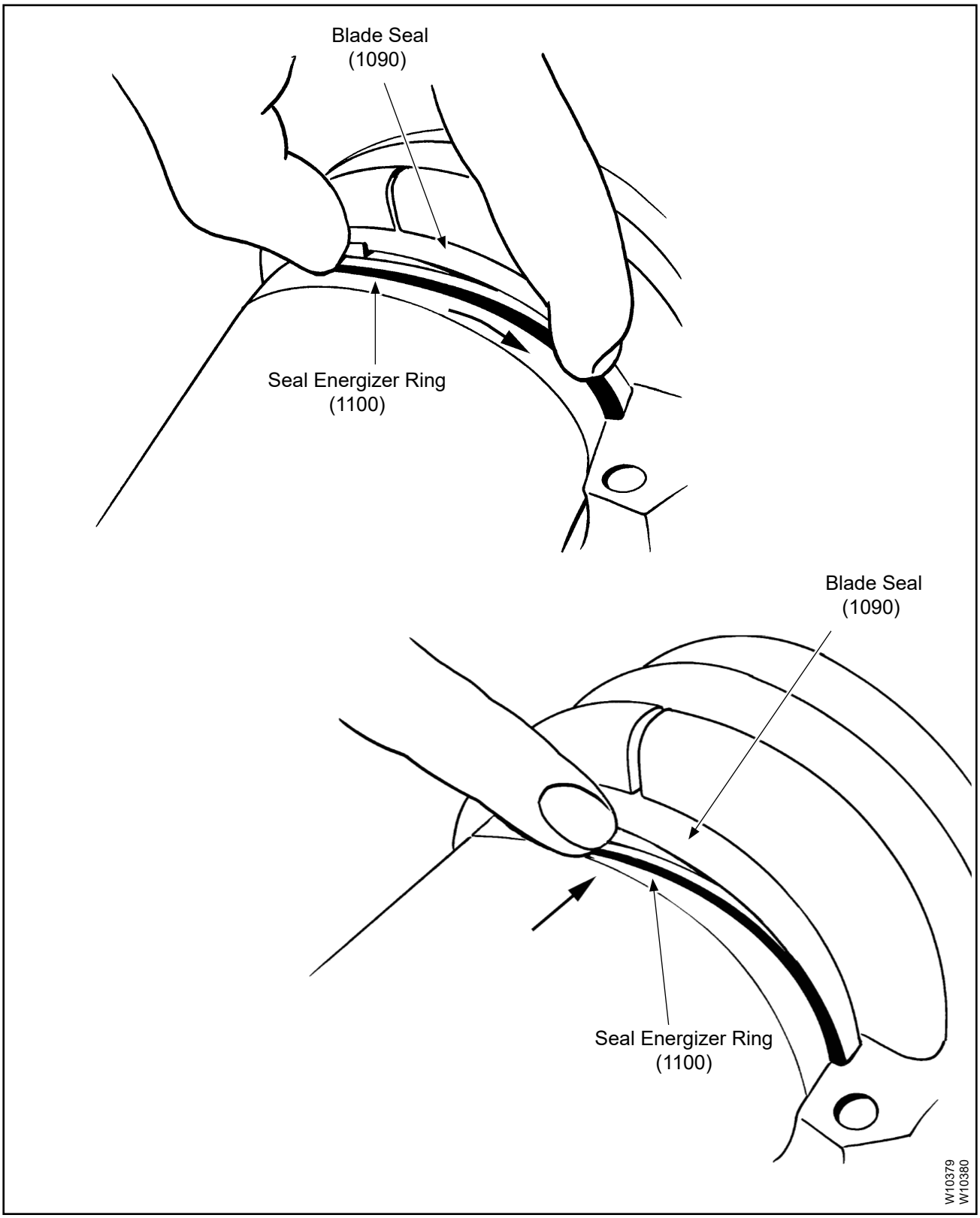


Installing the Seal Energizer Ring into the Blade Seal
Figure 7-20

(m) **For HC-E4A-3(A,I,J) models only**: Install the seal energizer ring (1100) in the blade seal (1090) groove. Refer to Figure 7-20.

1 Slide a seal energizer ring (1100) half into the blade seal (1090) groove.

CAUTION: THE SEAL ENERGIZER RING HALVES MUST BE POSITIONED SO THAT THE SPLIT LINES ARE IN VERTICAL POSITION.

2 Gently slide the remaining seal energizer ring half into the groove and around the blade shank.

NOTE: The use of blade seal alignment tool TE440 to aid in seating the blade seal in the blade seal groove is acceptable.

3 Repeat for the remaining blades.

CAUTION: MAKE SURE THAT THE BLADE SEAL IS CORRECTLY ALIGNED IN THE HUB GROOVE WHEN INSTALLING THE CYLINDER-SIDE HUB HALF.

(n) Use the guide hub bushing (530) to line up the halves of the hub, and fit the cylinder half of the hub unit onto the engine half of the hub unit.

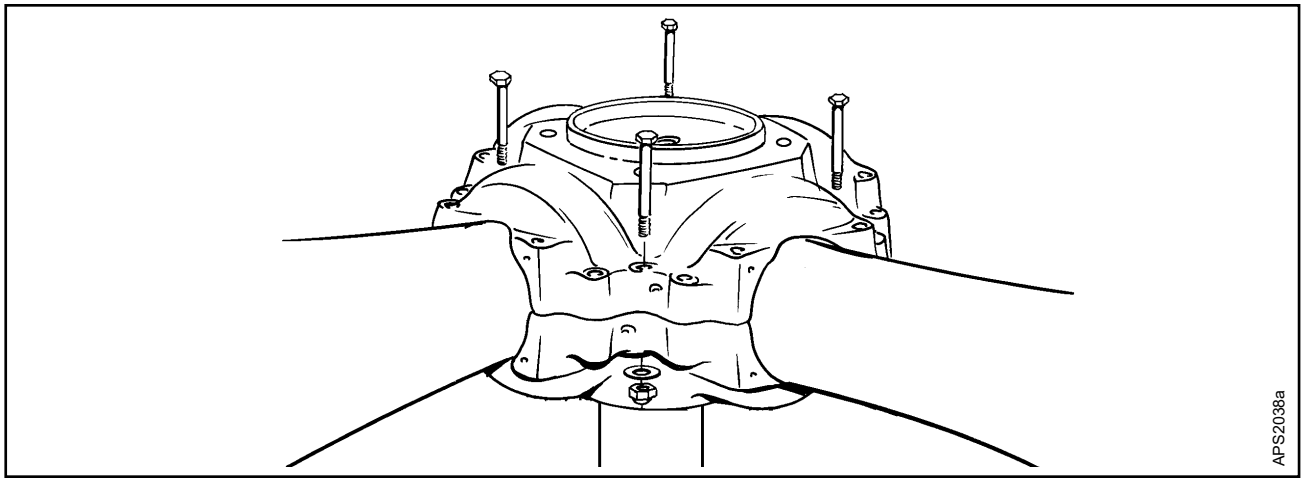
CAUTION: CHECK BLADE O-RING/BLADE SEAL FOR BINDING OR PINCHING WHEN THE CYLINDER-SIDE HUB HALF IS INSTALLED.

(o) Install the cylinder-side hub half.

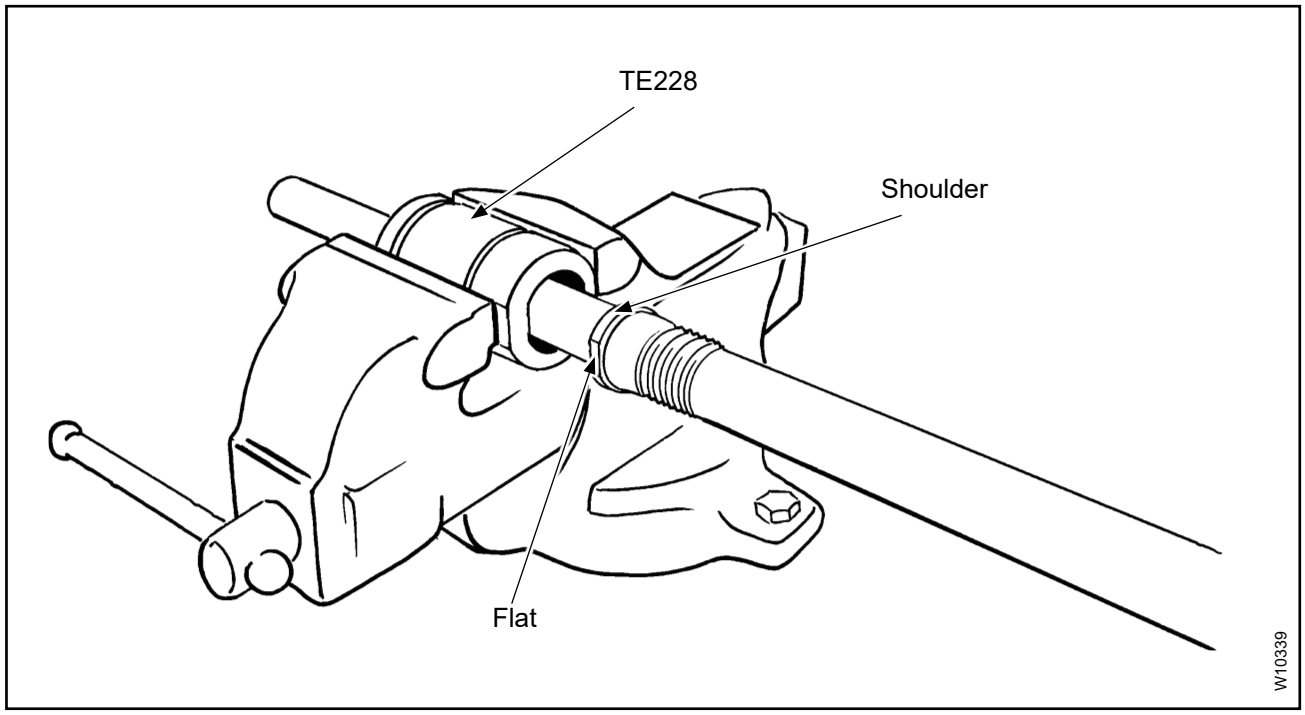
1 Position the hub half, using a rubber mallet if necessary.

(p) Positioned midway between each of the four blade sockets, install a bolt (570), washer (590), and nut (600). Refer to Figure 7-21.

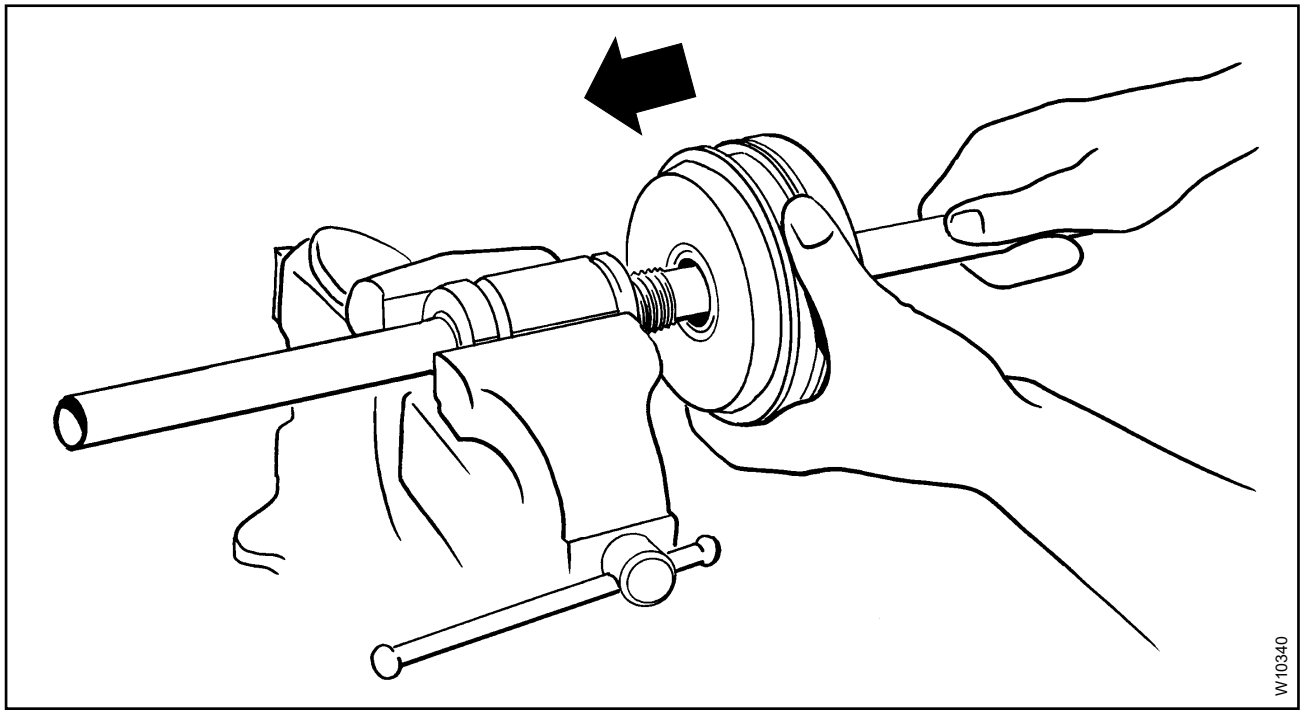
(q) Torque the nuts (600) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.



Installing the Cylinder-Side Hub Half
Figure 7-21



Using the TE228 Tool on the Pitch Change Rod
Figure 7-22



Installing the Piston
Figure 7-23

E. Hydraulic System Assembly

(1) Install the small piston O-ring (370) in the piston (330).

(2) Install the piston unit (320) on the pitch change rod (430).

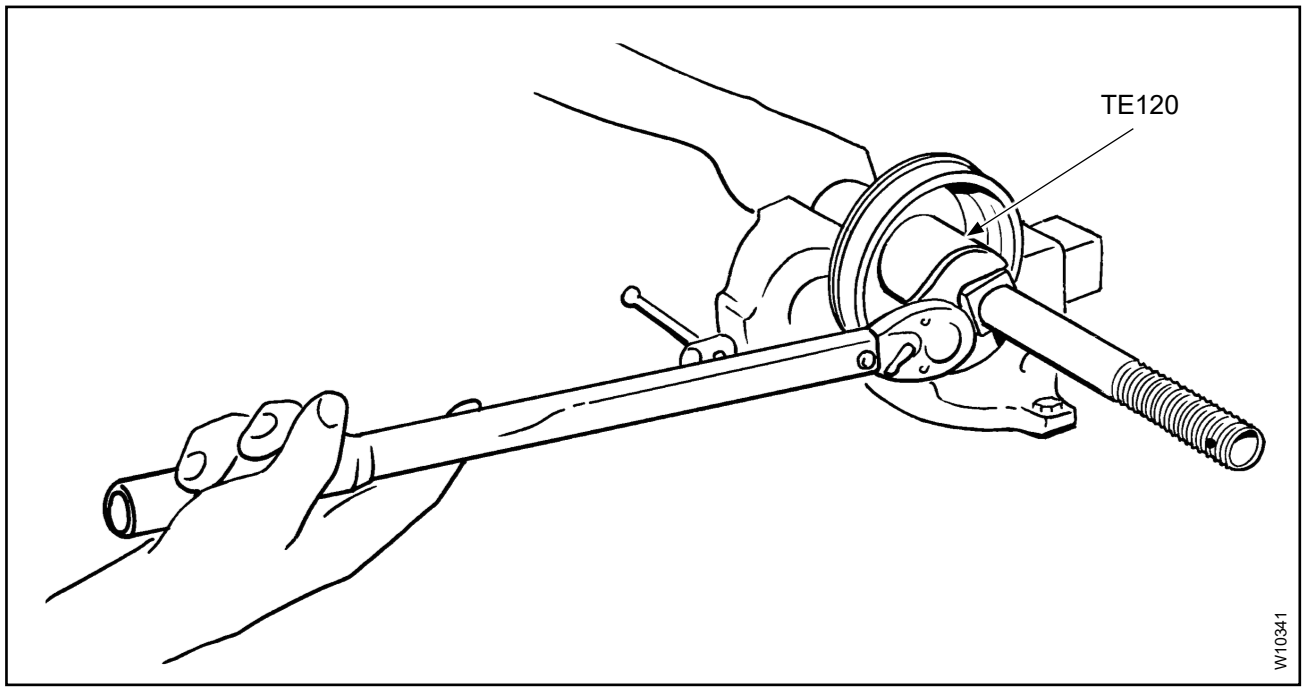
(a) Put the piston unit installation socket TE228 in a vise. Refer to Figure 7-22.

(b) Insert the pitch change rod through the piston unit installation socket TE228, fitting the socket over the shoulder flats on the pitch change rod as shown in Figure 7-22.

(c) Slide the piston (330) into place against the shoulder on the pitch change rod (430). Refer to Figure 7-23.

(d) Turn the piston self-locking nut (310) onto the pitch change rod (430) until the self-locking nut locking mechanism engages the pitch change rod threads.

(3) Using the modified deep well socket TE120, torque the piston self-locking nut (310) against the piston (330) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual. Refer to Figure 7-24.



Torquing the Piston Nut
Figure 7-24

(4) Apply anti-seize compound CM118 to the external threads adjacent to the tapered section of the pitch change rod (430). Refer to Figure 7-25.

(5) Insert the small diameter end of the pitch change rod (430) into the cylinder-side hub (450) half and through the fork unit (670) and engine-side hub half.

CAUTION: WHEN INSTALLING THE PITCH CHANGE ROD INTO THE FORK, DO NOT EXCEED THE MAXIMUM TORQUE IN ACCORDANCE WITH TABLE 8-1 IN THE FITS AND CLEARANCES CHAPTER OF THIS MANUAL.

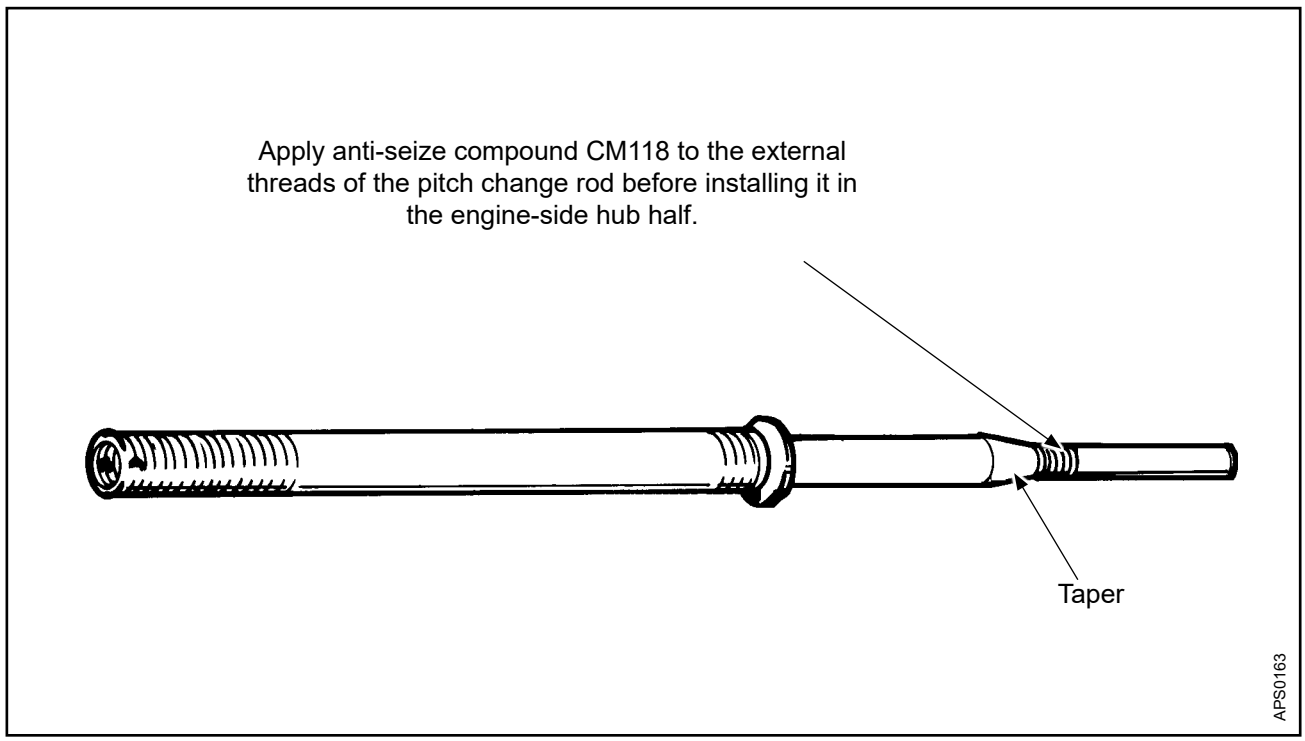
(6) Turn the pitch change rod (430) into the fork unit (670).

(7) Using the modified deep well socket TE120 on the self-locking hex nut (310), torque the pitch change rod (430) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(8) Move the blades by hand to make sure that the blades have full range of movement from reverse pitch to feather pitch.

(a) If there is not full blade angle movement, remove the hub-clamping bolts (570) and nuts (600) and slightly separate the hub (450) halves to permit preload plate (990) rotation.

(b) Repeat the hub-clamping bolt installation procedure after the preload plates have been properly positioned.



Applying CM118 to the Pitch Change Rod
Figure 7-25

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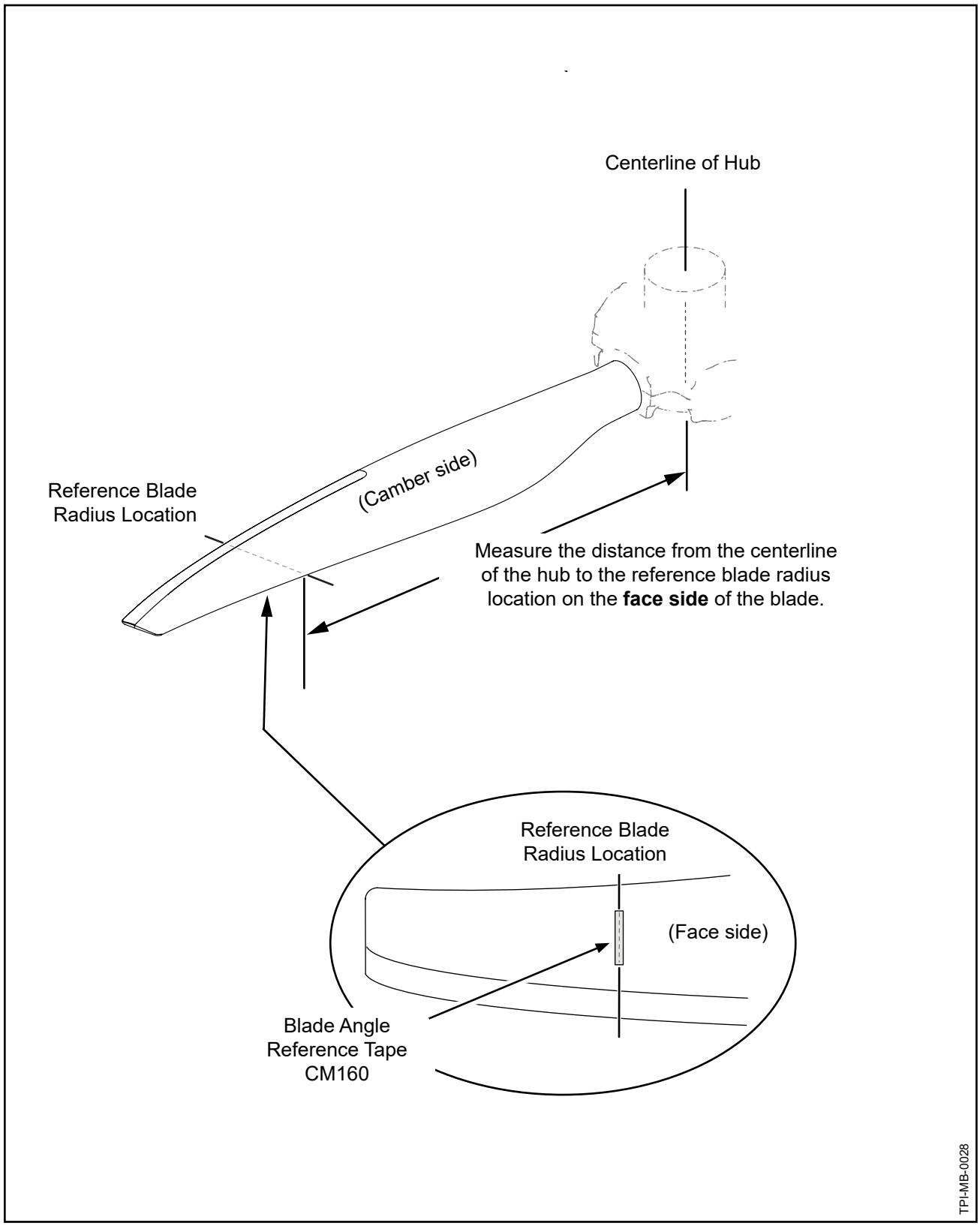


Blade Angle Reference Tape
Figure 7-26

F. Blade Angle Reference Tape Application (Optional) (Rev. 2)

CAUTION: DO NOT CONFUSE REFERENCE BLADE RADIUS WITH BLADE STATION. REFERENCE BLADE RADIUS AND BLADE STATION OF THE SAME NUMBER MAY NOT ALWAYS INDICATE THE SAME LOCATION ON THE BLADE.

(1) Reference blade radius is measured from the center of the propeller hub to a predetermined reference location on the blade for blade angle measurement.

(2) Blade stations are used during the repair or overhaul process of a blade to define a blade span location for dimensional measurement.

(3) Establish a reference blade radius location

(a) Refer to the Aircraft Type Certificate Data Sheet or the Hartzell Propeller Inc. Application Guide, Manual 159 (61-02-59), for the reference blade radius location specified for the applicable aircraft installation.

(b) Beginning with blade one, measure from the center of the propeller hub to the reference blade radius location specified. Refer to Figure 7-26.

(c) Apply a piece of reference tape CM160 to the face side of the blade at the reference blade radius location, perpendicular to the blade centerline as shown in Figure 7-26.

1 Put the reference tape CM160 on the blade so that the reference blade radius location runs through the centerline of the tape.

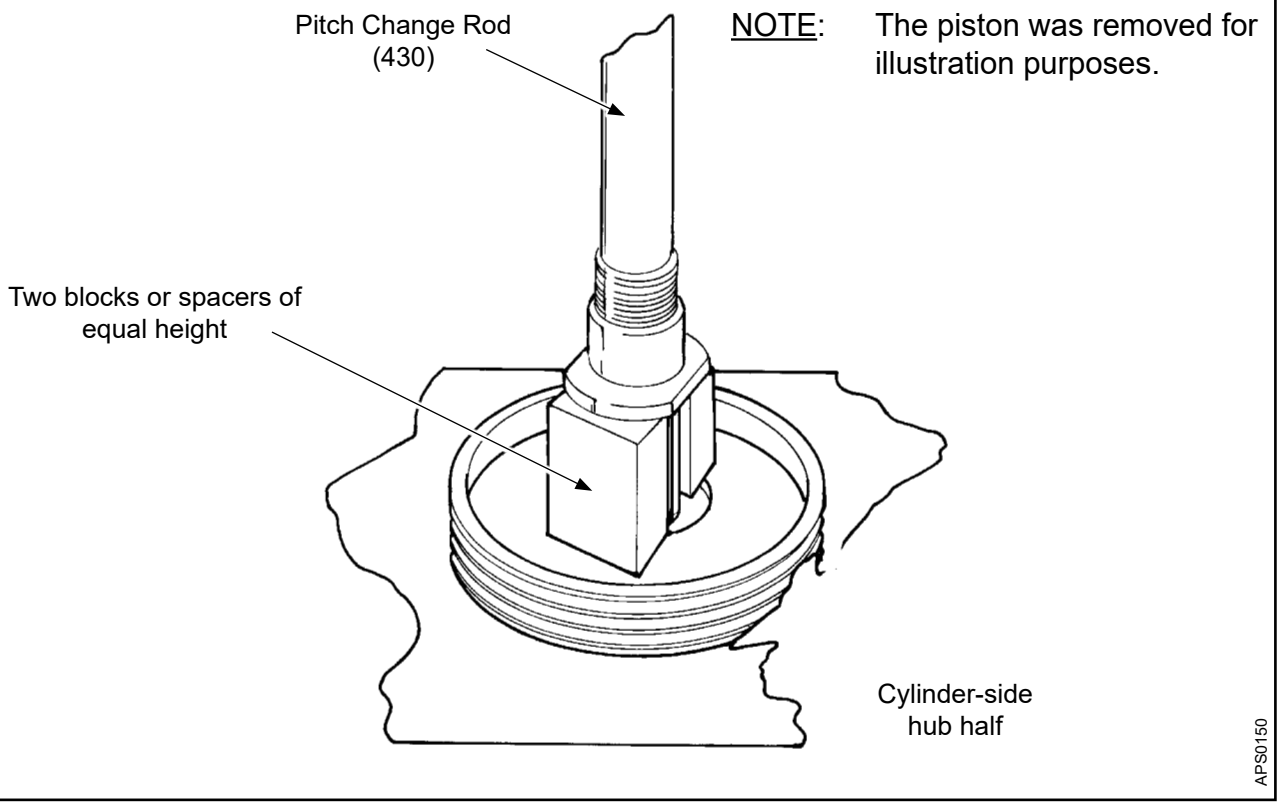
(d) Repeat steps (3)(b) and (3)(c) for the remaining blades in the hub assembly.

(e) Put a pattern cut-out over each piece of reference tape CM160.

(f) Spray each piece of reference tape CM160 with clear lacquer CM129 to prevent peeling.

PITCH CHANGE KNOB BRACKET UNIT PART NUMBER	CHANGE OF BLADE ANGLE	PITCH CHANGE KNOB BRACKET UNIT PART NUMBER	CHANGE OF BLADE ANGLE
B-464-1( )	-0.3°	100032-1	-0.3°
B-464-2( )	---	100032-2	---
B-464-3( )	+0.3°	100032-3	+0.3°
B-6257-1	-0.3°	103545-1	-0.3°
B-6257-2	---	103545-2	---
B-6257-3	+0.3°	103545-3	+0.3°
100028-1	-0.3°	108303-1	-0.3°
100028-2	---	108303-2	---
100028-3	+0.3°	108303-3	+0.3°

Blade Pitch Change Knob Bracket Unit Selection
Table 7-1



Checking Blade-to-Blade Angle Tolerance
Figure 7-27

G. Checking Blade-to-Blade Angle Tolerance

NOTE: The purpose of checking the blade angles is to verify that the blade angles of all four blades are within 0.2 degree of each other at the reference blade radius.

(1) As shown in Figure 7-27, put two blocks or spacers of equal height ±0.0005 inch (0.012 mm) under the piston and on opposite sides of the pitch change rod to hold the propeller in a low blade angle position.

(2) Check the blade angle at the reference blade radius location that is indicated by the blade angle reference tape.

(a) The propeller does not have to be at the final low pitch position for this check, but the blade angle for this check is 18 - 25 degrees.

(b) Move the blades by hand toward the high pitch position to make sure that the cam followers are properly seated against the fork.

(3) Using a protractor, check to make sure that the angle of each blade within the propeller varies no more than 0.2 degree from highest to lowest angle measurement.

(a) If the difference between the highest blade angle and the lowest blade angle is greater than 0.2 degree:

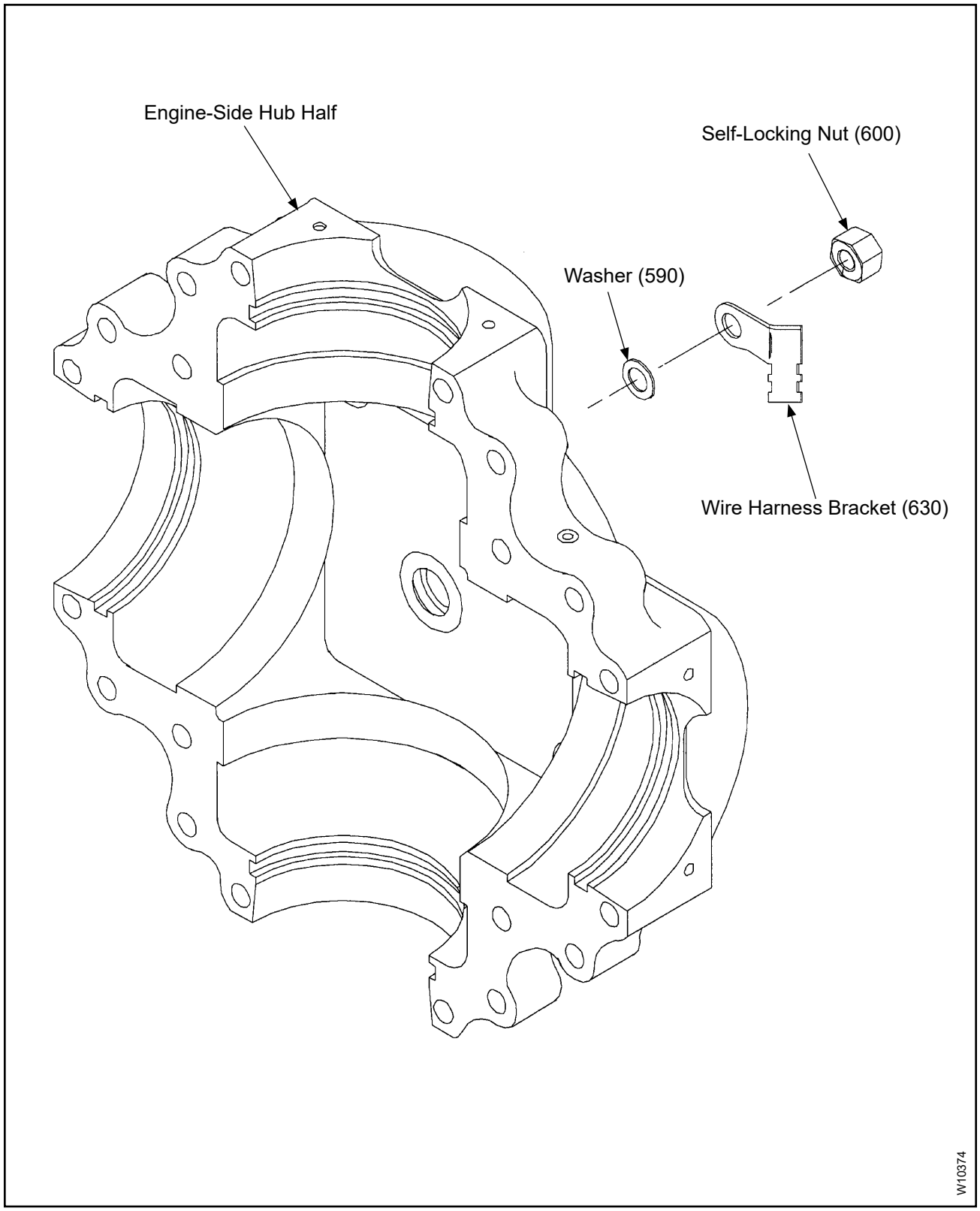
1 Replace the pitch change unit(s) on the blade(s).

a Refer to the chart, Blade Pitch Change Unit Selection, in Table 7-1 to select the appropriate pitch change bracket to increase or decrease the blade angle.

2 Recheck the blade-to-blade angle tolerance until the tolerance is achieved on all four blades.

NOTE: Each blade has tolerances for blade angles at the various blade stations. The ultimate effects of these tolerances upon vibration during operation are magnified by the blade-to-blade tolerances in the assembled propeller. Maintaining a blade-to-blade tolerance within 0.2 degree at the reference blade radius has been found to be an acceptable limit. Although not a requirement, an additional check of the blade-to-blade tolerance at the outermost blade station may be a worthwhile verification that all blades of a set are within tolerance. The difference between the highest blade angle and the lowest blade angle at the outermost station should not be greater than 0.4 degree.

(4) If the difference between the highest blade angle and the lowest blade angle is within 0.2 degree, continue to the next step.



Wire Harness Bracket Installation
Figure 7-28

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to remove the pitch change rod and the cylinder-side hub half, to install the remaining hex head bolts (570, 580), washers (590) and self-locking nuts (600), or to apply CM92 to the hub mating surfaces.

(5) Remove the pitch change rod and the cylinder-side hub half.

CAUTION: DO NOT PERMIT EXCESSIVE SEALANT TO BE SQUEEZED INTO THE BLADE RETENTION SOCKETS.

(6) Put a bead of sealant CM92 on the hub mating surfaces. Refer to Figure 7-29.

(a) Sealant must contact the blade O-rings.

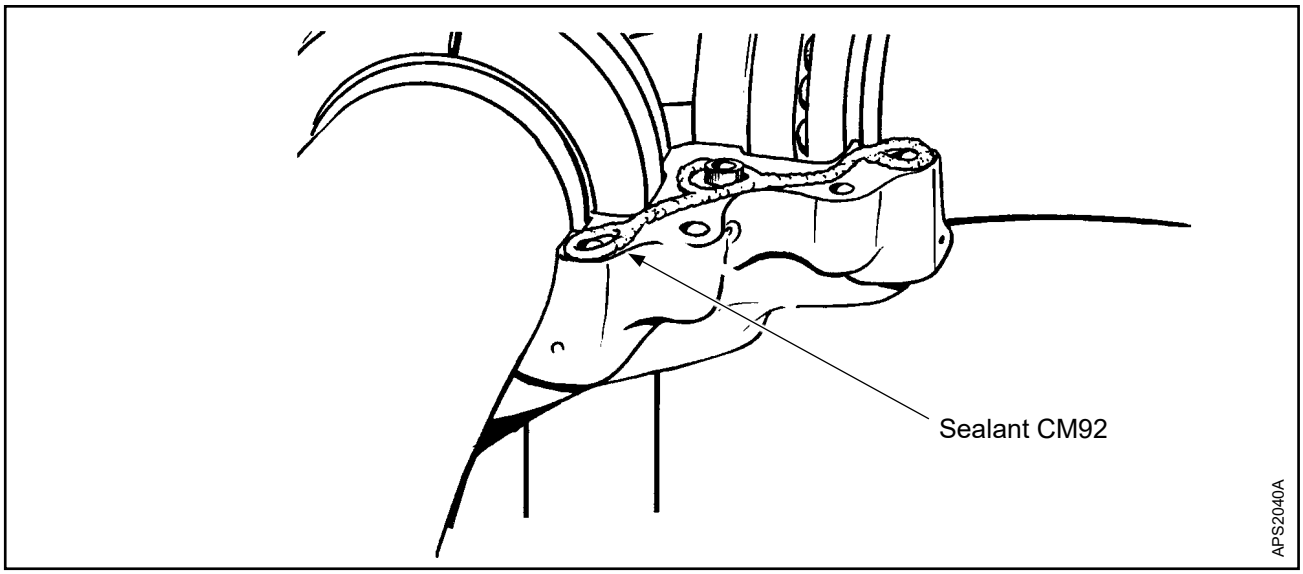
(b) Use only enough sealant on the mating surfaces so that a small amount will be squeezed out along the entire parting surface when the hub nuts are properly torqued.

(7) Install the hex head bolts (570, 580), washers (590) and self-locking nuts (600).

(a) **For HC-E4A-3(A,I,J) only**: Install the four (4) wire harness brackets (630) at four locations as shown in Figure 7-28.

1 Install the washer (590) between the wire harness bracket (630) and the engine-side hub half.

(8) Torque the nuts (600) on the hex head bolts (570, 580) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.



Applying Sealant Between the Hub Halves
Figure 7-29

H. Lightning Conductor Bolt Gap Adjustment, if applicable.

(1) Adjustment for the lightning conductor bolt (610) and nut (620) configuration.

(a) Adjust the gap between the head of the bolt (610) and the inboard surface of the blade counterweight clamp to 0.005 to 0.085 inch (0.13 to 2.15 mm). Refer to Figure 7-30.

(b) The gap must remain within the dimensions given through the entire pitch change range of the blades.

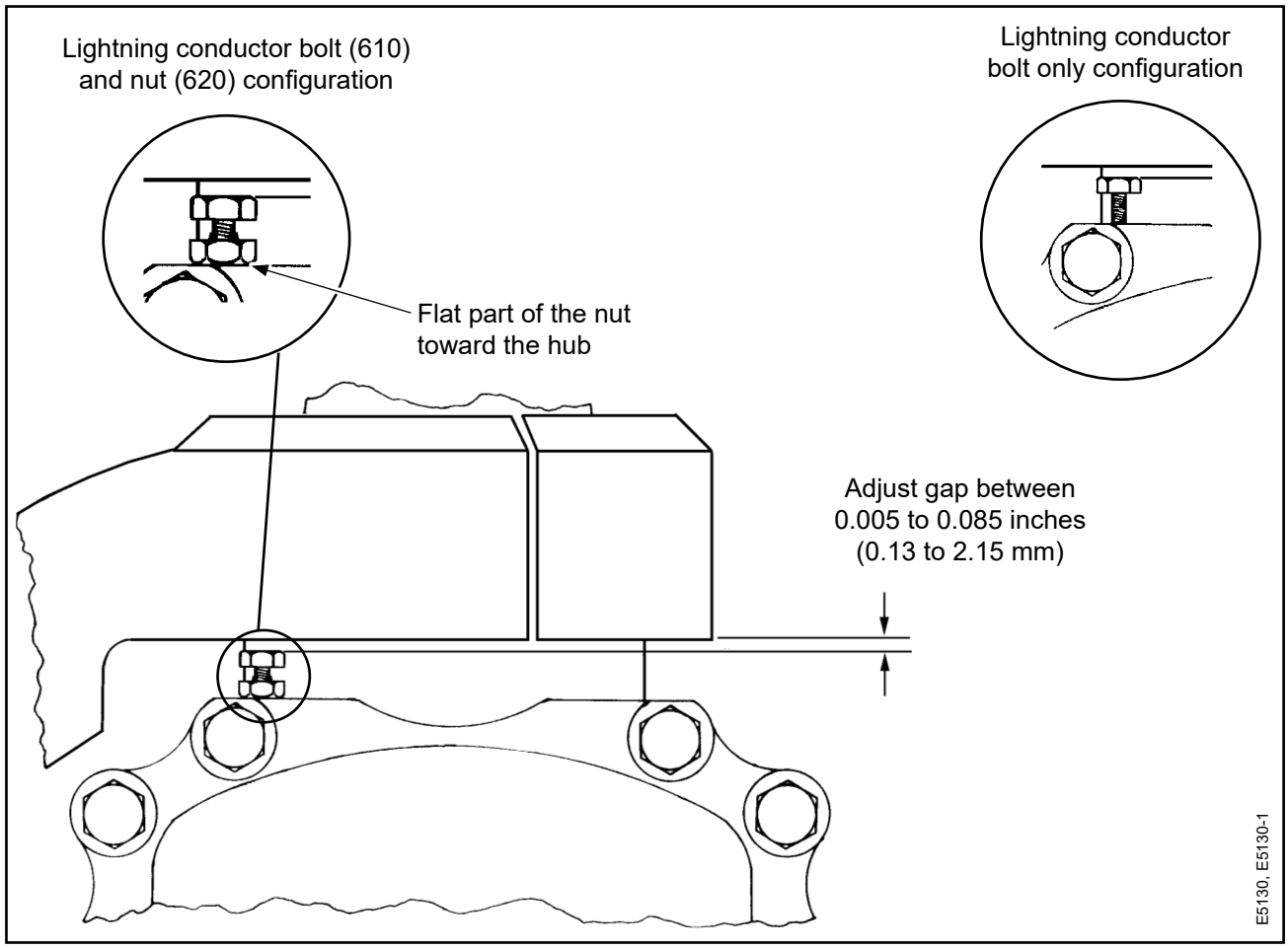
(c) Torque the nut (620) against the hub.

(d) Recheck the gap and adjust as necessary.

(2) Adjustment for the lightning conductor bolt (610) only configuration.

(a) Adjust the gap between the head of the bolt (610) and the inboard surface of the blade counterweight clamp to 0.005 to 0.085 inch (0.13 to 2.15 mm). Refer to Figure 7-30.

(b) The gap must remain within the dimensions given through the entire pitch change range of the blades.



Location and Adjustment of Lightning Conductor Bolt
Figure 7-30

I. Pitch Adjustment Unit Assembly

CAUTION: REFER TO THE APPLICABLE AIRCRAFT TYPE CERTIFICATE DATA SHEET AND/OR HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR SPECIFIC BLADE ANGLES REQUIRED.

(1) Install the piston OD O-ring (390) in the groove closest to the hub (450). Refer to Figure 7-31.

(2) Cut the necessary length of piston dust seal material (380).

(a) Cut the piston dust seal material (380) on a 30 degree diagonal so there will be an overlap at the parting line with a smooth surface, free of fuzz. Refer to Figure 7-31, View A-A.

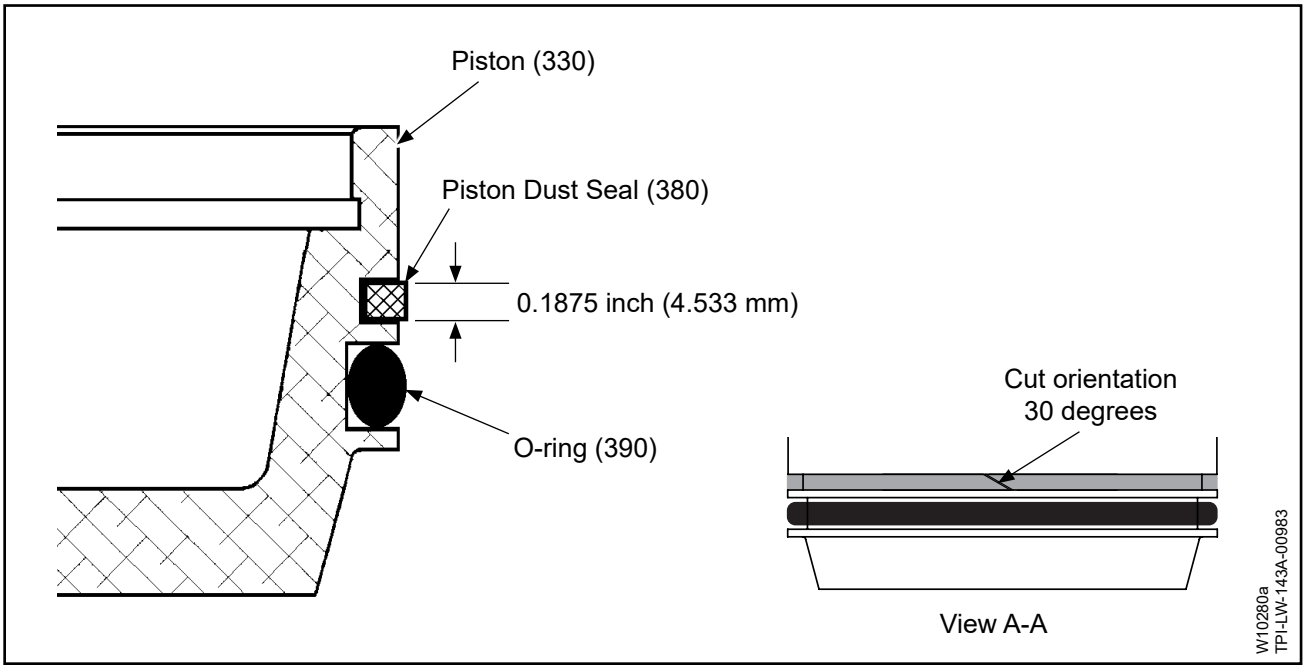
(3) Soak the piston dust seal (380) in aviation grade turbine engine oil until the seal is completely saturated.

(4) Squeeze the excess oil from the piston dust seal (380).

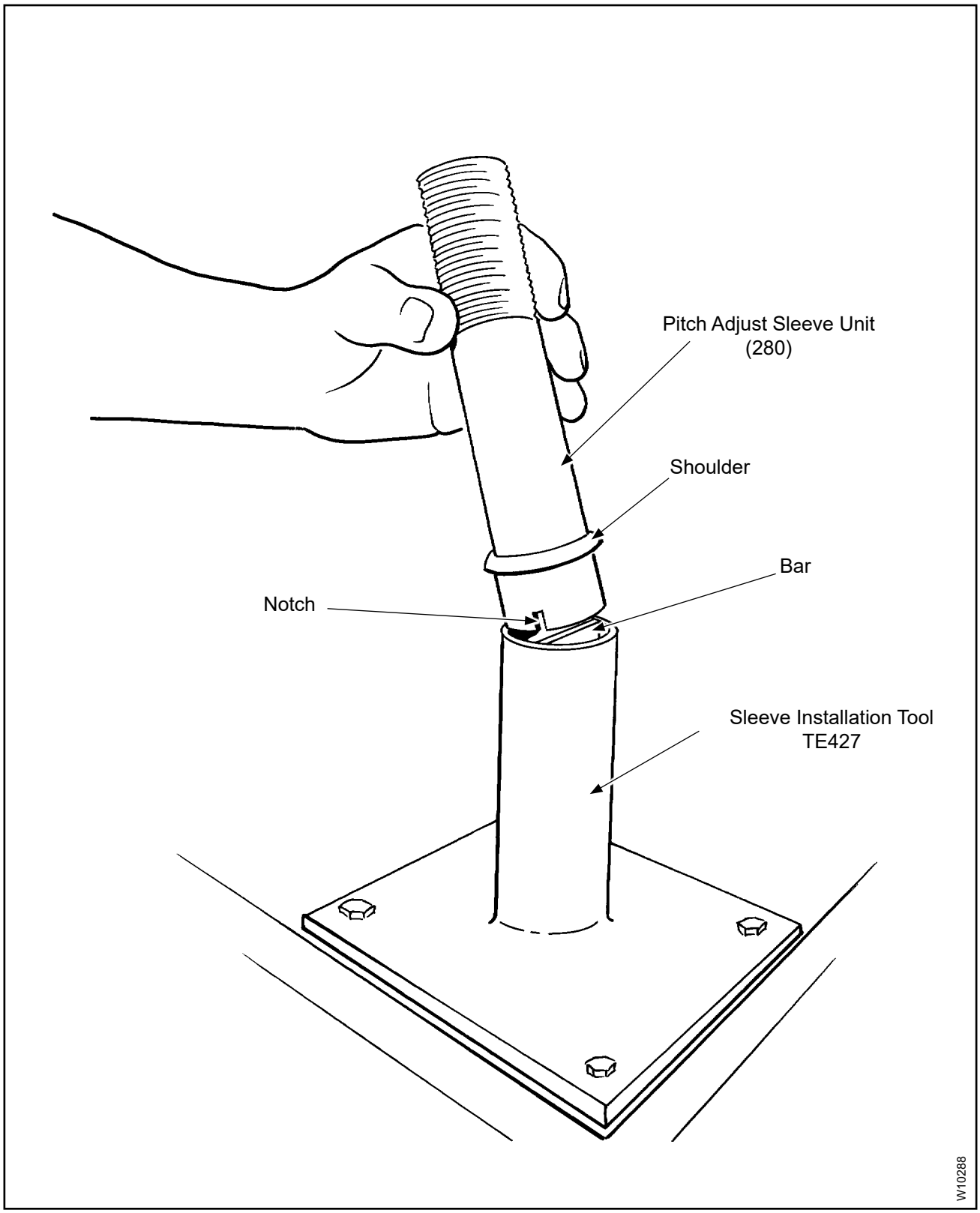
CAUTION: MAKE SURE THAT THE PISTON DUST SEAL (380) IS FREE OF FUZZ.

(5) If the piston dust seal (380) has fuzz or long strands that could interfere with O-ring operation, replace the piston dust seal.

(6) Install the thinnest section of the piston dust seal (380) in the remaining piston OD groove. Refer to Figure 7-31.



Locations of the Piston O-ring and Piston Dust Seal
Figure 7-31



Putting the Pitch Adjustment Sleeve Unit on the Sleeve Installation Tool TE427
Figure 7-32

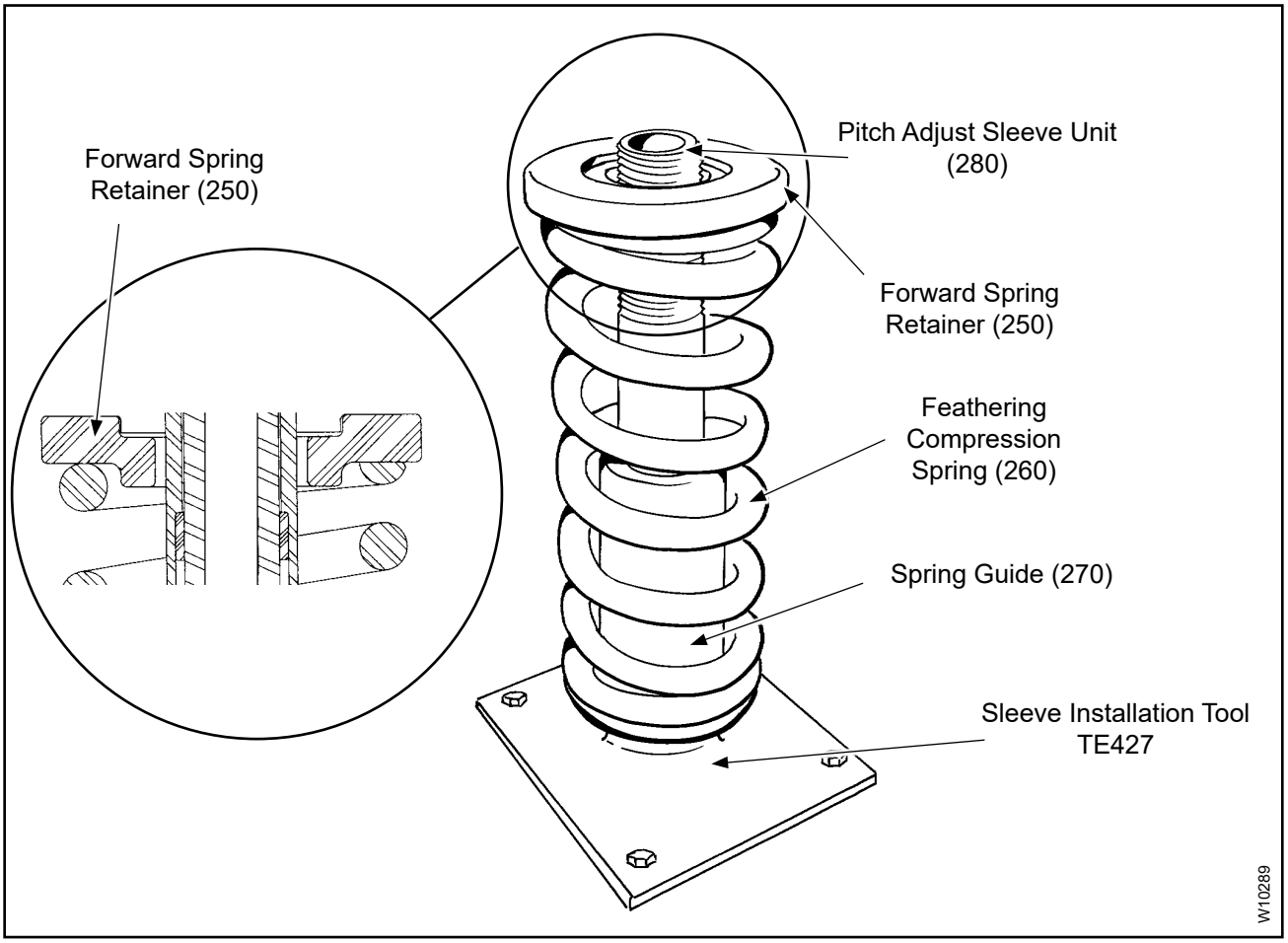
(7) Installing the cylinder.

(a) Installing the pitch adjust sleeve unit (280) into the cylinder using the sleeve installation tool TE427, or equivalent.

1 Fit the notches of the pitch adjust sleeve unit (280) into place on the bar of the sleeve installation tool TE427, or equivalent. Refer to Figure 7-32.

2 Slide the spring guide (270) over the pitch adjust sleeve unit (280) on the sleeve installation tool TE427, or equivalent until the spring guide is resting on the shoulder of the pitch adjust sleeve unit. Refer to Figure 7-32 and Figure 7-33.

3 Apply anti-seize compound CM118 or CM151 to both end coils of the spring (260) and the first two threads of the pitch adjust sleeve unit (280).



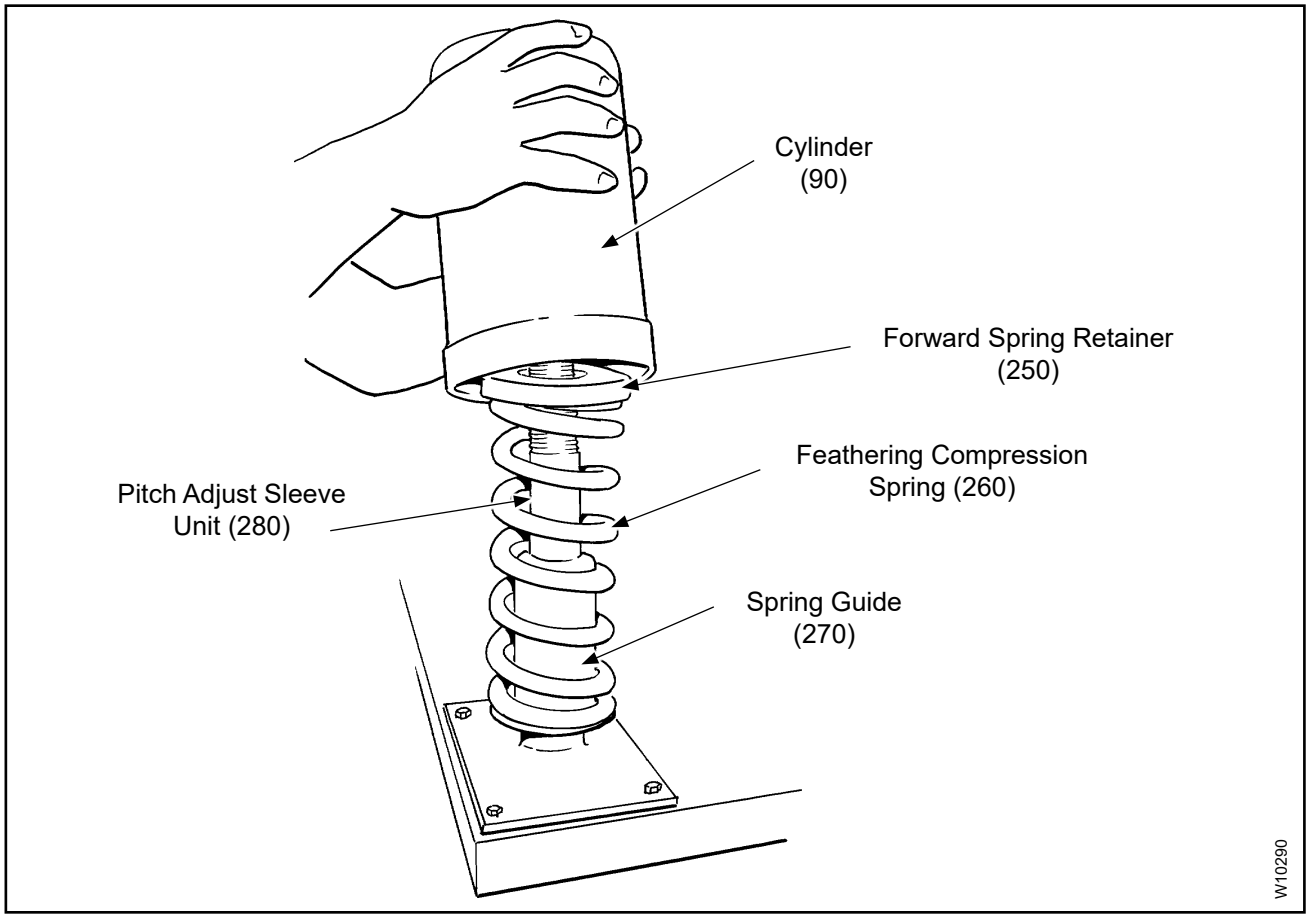
Installing the Feathering Compression Spring on the Pitch Adjust Sleeve Unit
Figure 7-33

4 Put the feathering compression spring (260) over the pitch adjust sleeve unit (280) and spring guide (270) on the sleeve installation tool TE427, or equivalent, with the feathering compression spring resting on the lip of the spring guide (270). Refer to Figure 7-34.

5 With the raised shoulder toward the feathering compression spring (260), install the forward spring retainer (250), if applicable, over the pitch adjust sleeve unit (280) on the sleeve installation tool TE427, or equivalent. Refer to Figure 7-33.

CAUTION: DO NOT DAMAGE THE PITCH ADJUST SLEEVE UNIT (280) OR THE CYLINDER (90) THREADS WHEN INSTALLING THE CYLINDER.

6 Put the cylinder (90) over the parts on the sleeve installation tool TE427, or equivalent and turn the cylinder onto the pitch adjust sleeve unit (280). Refer to Figure 7-34.



Starting the Cylinder on the Reverse Adjust Sleeve
Figure 7-34

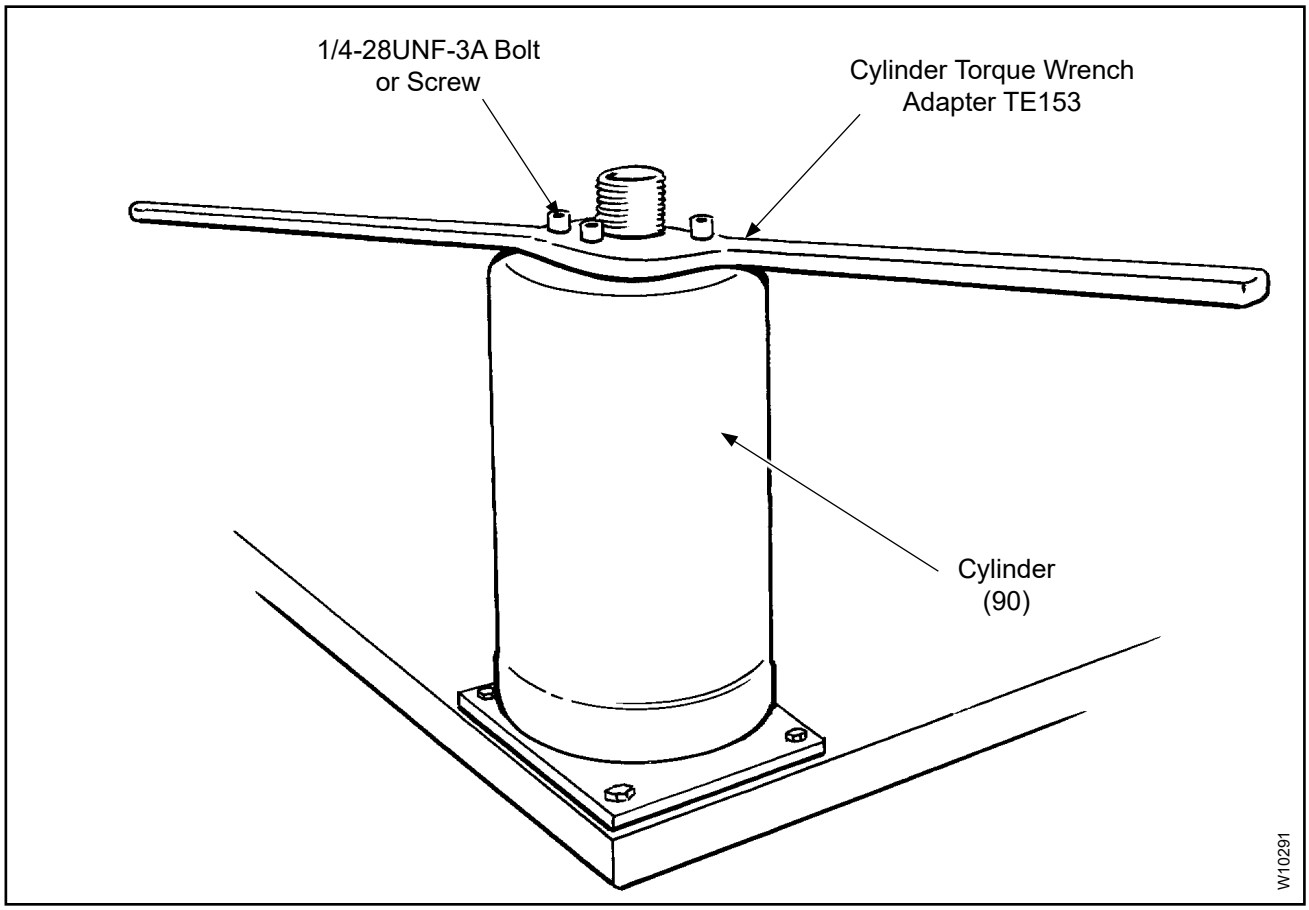
7 Using four 1/4-28UNF-3A bolts or screws, attach the cylinder torque wrench adapter TE153, or equivalent to the cylinder (90). Refer to Figure 7-35.

WARNING: MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE ASSEMBLY PROCEDURE WHEN COMPRESSED, THE SPRING IS LOADED TO APPROXIMATELY 1000 POUNDS (454 KG) FORCE.

8 Turn the cylinder torque wrench adapter TE153, or equivalent until the feathering compression spring (260) is fully compressed. Refer to Figure 7-35.

WARNING: USE CARE WHEN HANDLING A CYLINDER CONTAINING A COMPRESSED SPRING.

9 With the cylinder torque wrench adapter TE153, or equivalent attached, remove the cylinder (90) from the sleeve installation tool TE427, or equivalent.



Compressing the Feathering Compression Spring
Figure 7-35

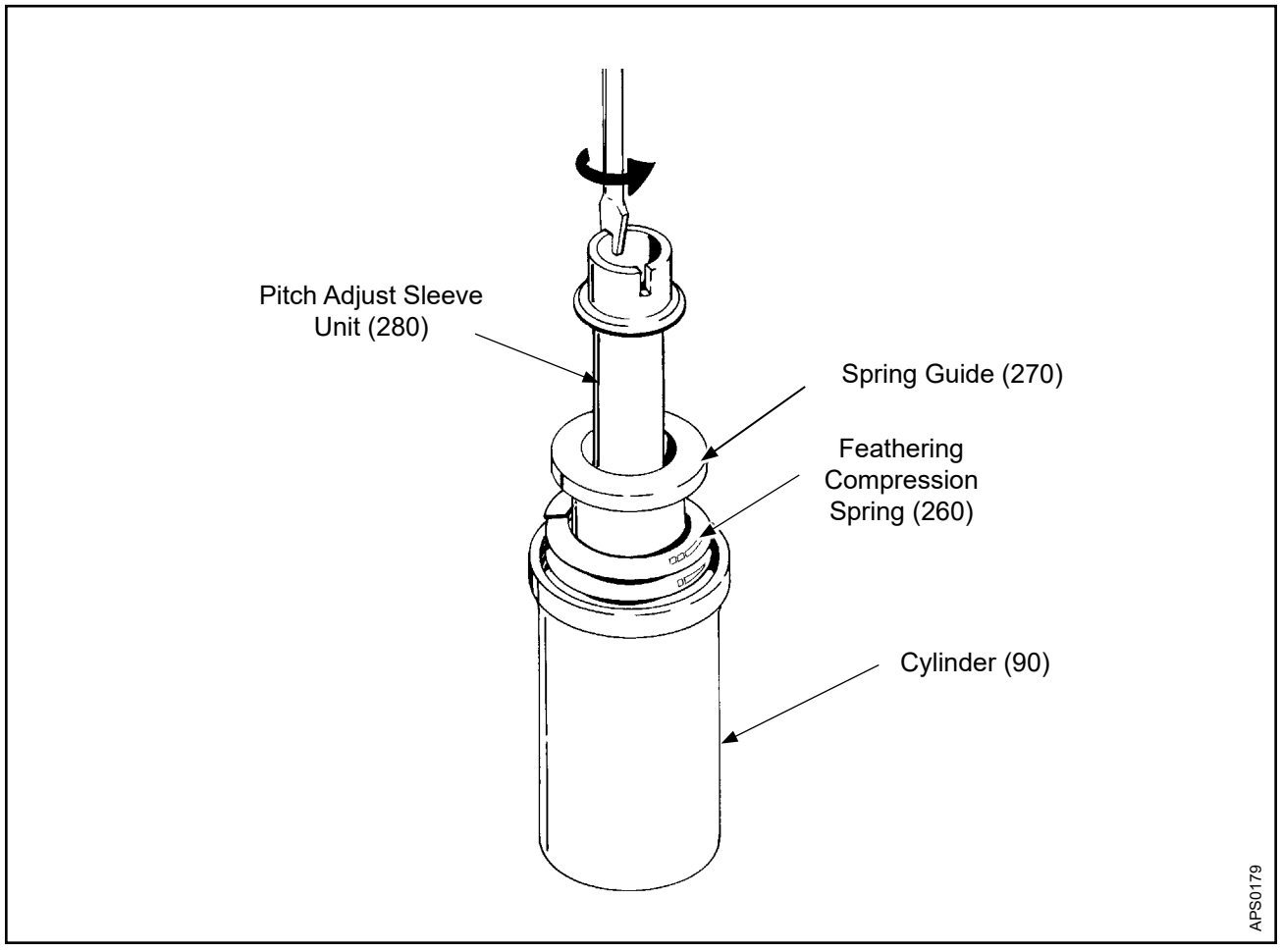
(b) Installing the pitch adjust sleeve unit (280) into the cylinder without using the sleeve installation tool TE427, or equivalent.

1 Apply anti-seize compound CM118 or CM151 to both end coils of the spring (260) and the first two threads of the pitch adjust sleeve unit (280).

2 Install the pitch adjust sleeve unit (280) through the spring guide (270), feathering compression spring (260), and the forward spring retainer (250).

3 As shown in Figure 7-36, use a screwdriver in the slot in the pitch adjust sleeve unit (280) to thread the sleeve through the cylinder (90) far enough that a wrench can be applied to the flat surface on the end of the sleeve to continue screwing it into the cylinder until the feathering compression spring (260) is fully compressed.

4 Using four 1/4-28UNF-3A bolts or screws, attach the cylinder torque wrench adapter TE153, or equivalent to the cylinder (90).



Using a Screwdriver to Thread the Pitch Adjust Sleeve Unit Through the Cylinder
Figure 7-36

(c) Install the cylinder-half hub shoulder O-ring (440). Refer to Figure 7-37.

CAUTION: DO NOT APPLY ANTI-SEIZE COMPOUND CM118 TO THE MOUNTING THREADS ON THE CYLINDER.

(d) Apply anti-seize compound CM118 to the cylinder mounting threads on the hub only.

1 Using a clean cloth, remove any excess anti-seize compound CM118 from the area above the cylinder mounting threads on the hub.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to apply CM92 around the shoulder of the cylinder half of the hub next to the O-ring (440).

(e) Apply a bead of sealant CM92 around the shoulder of the cylinder half of the hub next to the O-ring (440). Refer to Figure 7-37.

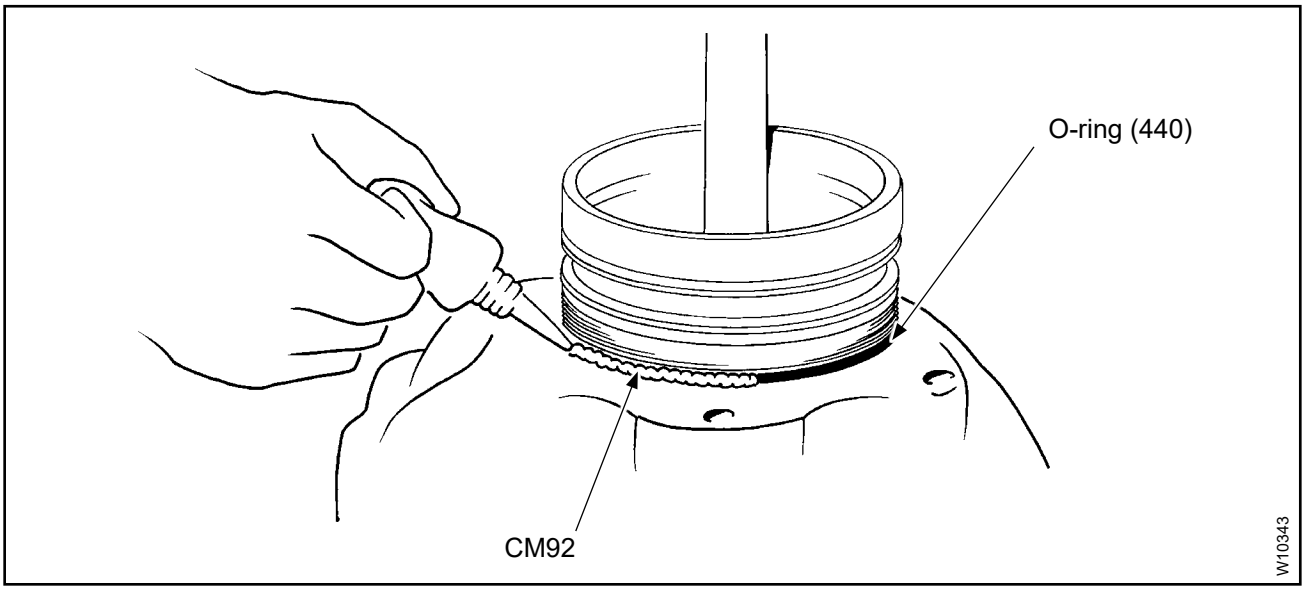
CAUTION 1: DO NOT DAMAGE THE CYLINDER THREADS WHEN INSTALLING THE CYLINDER (90).

CAUTION 2: DO NOT DAMAGE THE PISTON O-RING (390) WHEN INSTALLING THE CYLINDER (90).

(f) Carefully slide the cylinder (90) over the piston unit (320) onto the hub (450) threads.

CAUTION: MAKE SURE THAT THE CYLINDER THREADS ARE ALIGNED WITH THE HUB THREADS.

(g) Turn the cylinder (90) counterclockwise until the threads align.



Applying a Bead of Sealant to the Hub Shoulder
Figure 7-37

(h) Turn the cylinder (90) on the hub threads by hand.

(i) Using the torque wrench adapter TE153, or equivalent, torque the cylinder (90) onto the hub (450) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

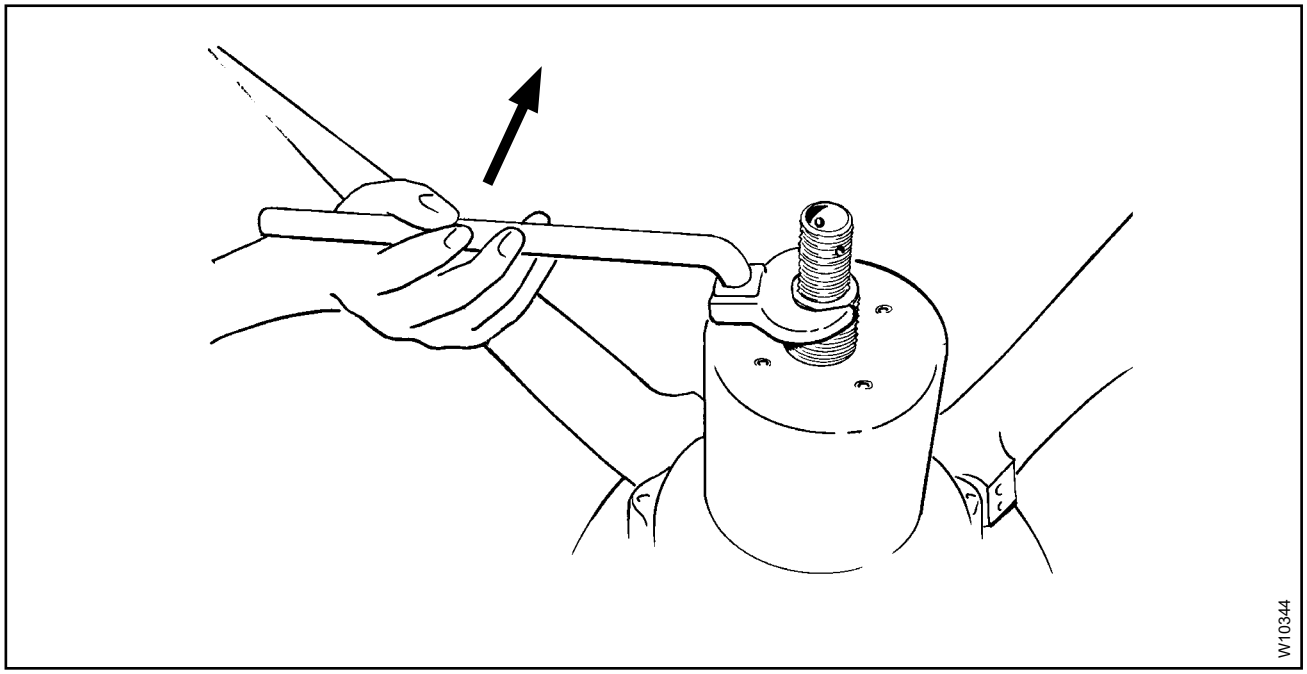
(j) Remove the four 1/4-28UNF-3A bolts or screws from the torque wrench adapter TE153, or equivalent and cylinder (90).

(k) Remove the torque wrench adapter TE153, or equivalent from the cylinder (90).

(8) Install the drilled hex nut (60) on the pitch adjust sleeve unit (280).

CAUTION: IF THE FEATHERING COMPRESSION SPRING (260) IS NOT IN CONTACT WITH THE PISTON, THE PISTON WILL SLAM UP ONTO THE BOTTOM OF THE FEATHERING COMPRESSION SPRING WHEN 200 PSI IS APPLIED.

(9) Using a 1-3/16 inch open end wrench, engage two of the flats on the pitch adjust sleeve unit (280) and turn it approximately 3 turns clockwise, or until all resistance is eliminated to permit the feathering compression spring (260) to make contact with the piston. Refer to Figure 7-38.



Turning the Pitch Adjust Sleeve Unit
Figure 7-38

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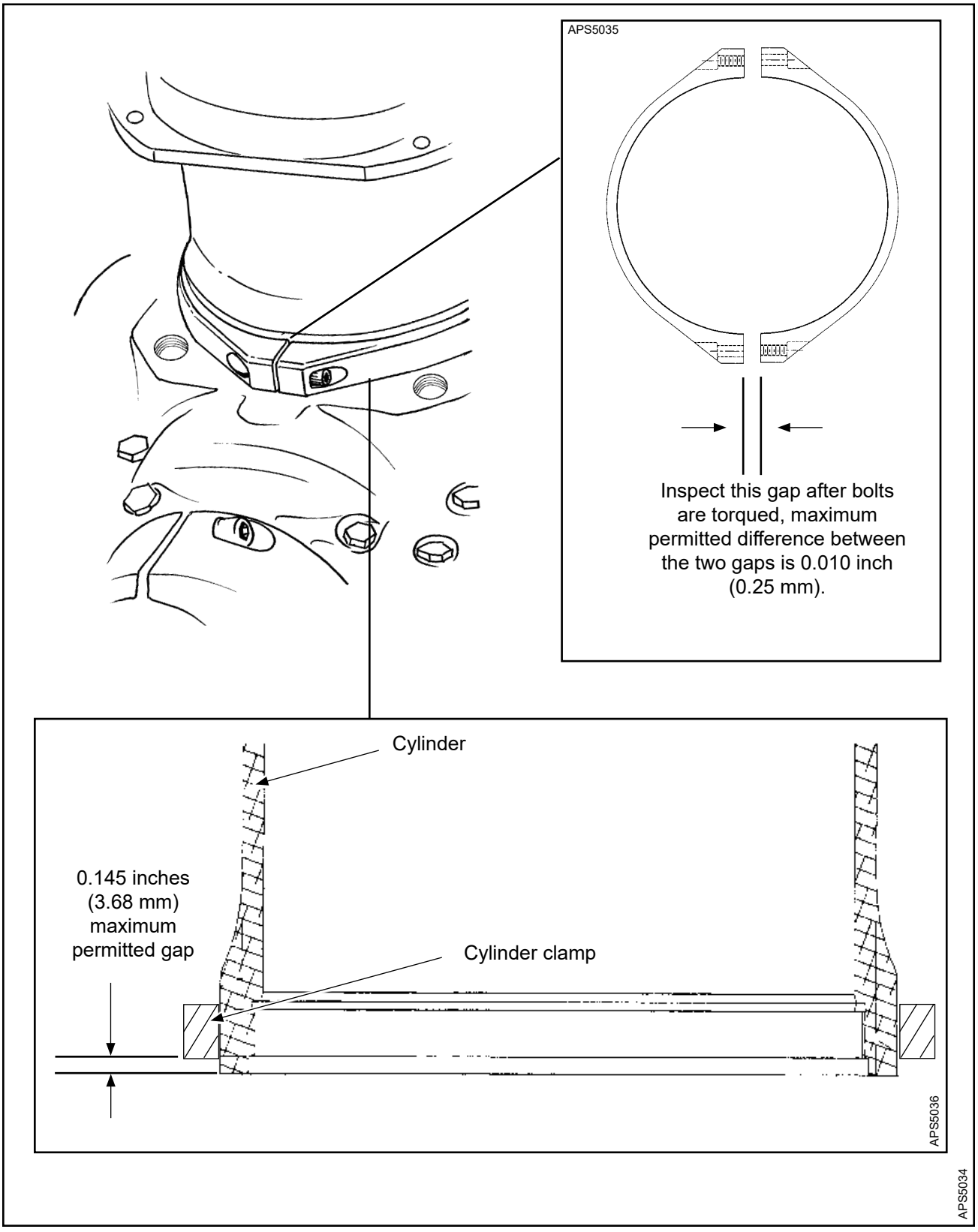


Cylinder Clamp Position and Gap Specifications
Figure 7-39

(10) Install the cylinder clamp (230), if applicable.

NOTE: A bead of sealant CM92 is applied to the cylinder shoulder of the hub during assembly of the propeller. During cylinder installation the sealant usually squeezes out between the cylinder and the hub. There is no need to remove the excess cured sealant from the base of the cylinder as long as no sealant will be between the cylinder and the clamp.

CAUTION: DURING INSTALLATION ON THE CYLINDER, CENTER THE CYLINDER CLAMP FLANGES ON THE BLADE SOCKET AND AS CLOSE TO THE HUB AS POSSIBLE.

(a) Install the cylinder clamp halves (230) onto the cylinder (90) with the threaded end of one cylinder clamp half aligned with the unthreaded half of the other cylinder clamp half. Position the cylinder clamp halves with the mating flanges centered on the hub sockets. Refer to Figure 7-39.

CAUTION: DO NOT REUSE THE CYLINDER CLAMP SCREWS (240). THE SCREWS ARE MANUFACTURED WITH LOCKING COMPOUND ALREADY ON THE THREADS. THE LOCKING COMPOUND CAN ONLY BE ACTIVATED ONCE DURING INSTALLATION OF THE SCREW; THEREFORE, THE SCREWS MUST BE DISCARDED IF THEY ARE REMOVED FROM THE CYLINDER CLAMP.

(b) Install the cylinder clamp screw (240) in both clamp flanges and tighten until the clamp (230) becomes snug on the cylinder (90). Refer to Figure 7-39.

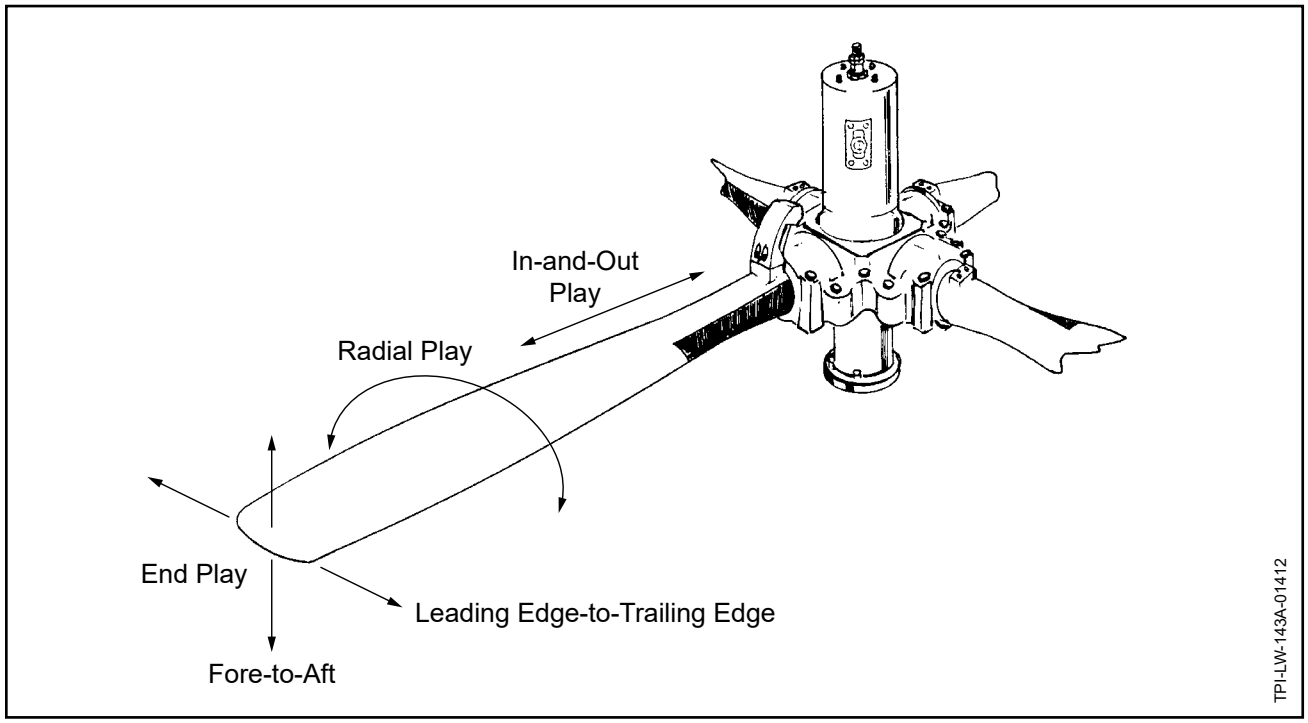
(c) Check the gap between the cylinder clamp (230) and the hub (450). The maximum permitted gap between the cylinder clamp and the hub is 0.145 inches (3.68 mm). Make sure that there is an equal amount of gap around the entire circumference of the cylinder clamp. Refer to Figure 7-39.

(d) Torque the cylinder clamp screws (240) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual. Inspect the gap between the clamp halves (230) while torquing the screws. The difference between the two gaps must not exceed 0.010 inch (0.25 mm).

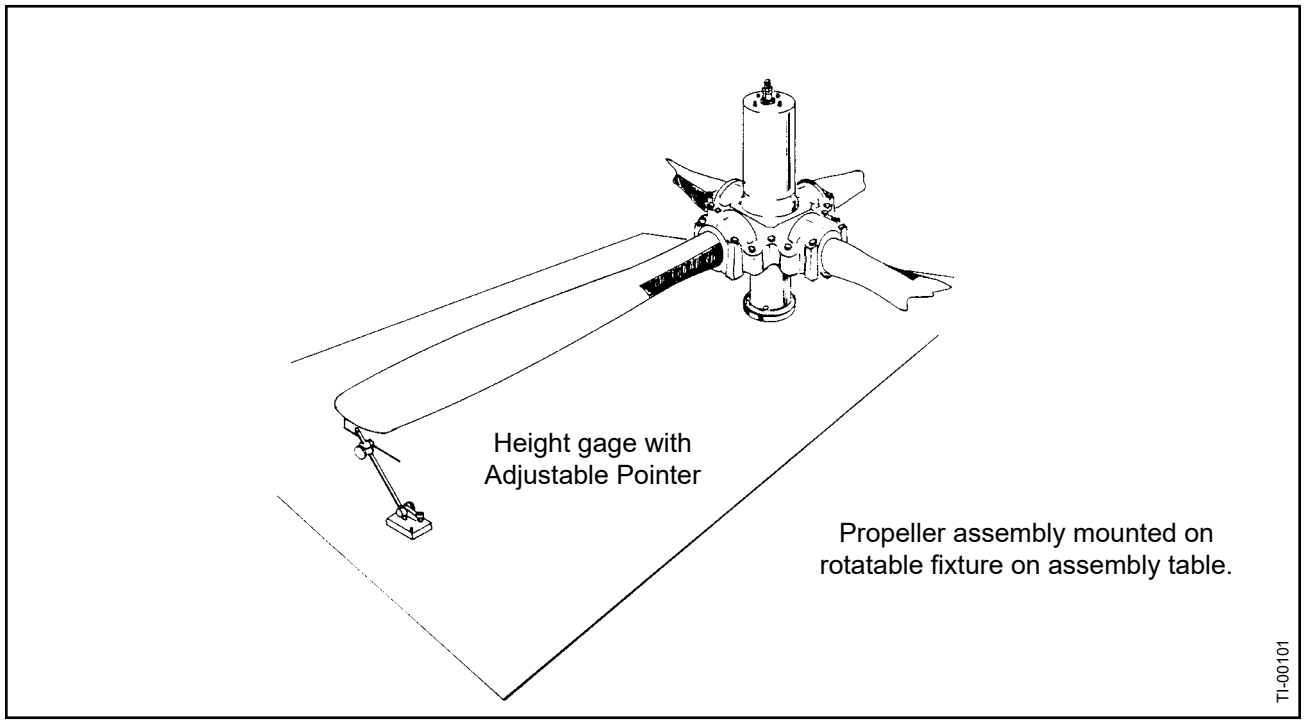
(11) Using lubricant CM12, lubricate the O-ring (80) and install in the groove of the pitch change rod plug (70), if applicable.

(12) If applicable, turn the pitch change rod plug (70) into the pitch change rod (430) until the end of the pitch change rod plug is flush or slightly below flush with the end of the pitch change rod.

(a) Align the slot in the pitch change rod plug with the holes in the pitch change rod.



Checking Blade Play
Figure 7-40



Checking Blade Track
Figure 7-41

J. Blade Installation Checks

(1) Apply 200 psi (13.78 bars) air pressure to the propeller to move the blades toward low pitch until the blade tips are approximately parallel to the bench surface.

(2) Check for fore-and-aft or end play movement in each blade. Refer to the Fits and Clearances chapter of this manual for blade tolerances. Refer to Figure 7-40.

(a) If there is fore-and-aft movement in a blade, it may indicate that the blade preload is set too loose. Refer to the section, "Blade Installation" in this chapter.

CAUTION: BLADE TRACK MUST NOT VARY MORE THAN THE TOLERANCE SPECIFIED FROM HIGHEST BLADE HEIGHT TO LOWEST BLADE HEIGHT.

(3) Using a height gage, check the blade track at the tip/face of each blade. Refer to Figure 7-41. Refer to the Fits and Clearances chapter of this manual for blade tolerances.

K. Setting the Reverse Angle of the Blades

NOTE: Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Application Guide Manual 159 (61-02-59) for the specific reverse blade angle and blade radius required.

(1) Apply 200 psi (13.78 bars) air pressure to the propeller to move the propeller pitch change components against the pitch adjust sleeve unit (280).

(2) Remove play from the blades by pushing the counterweight or counterweight clamp toward feather.

(3) Using a protractor TE96, TE97, or equivalent, check the reverse angle of each blade at the appropriate blade radius location. Refer to Figure 7-42.

(4) If the reverse blade angle is not correct:

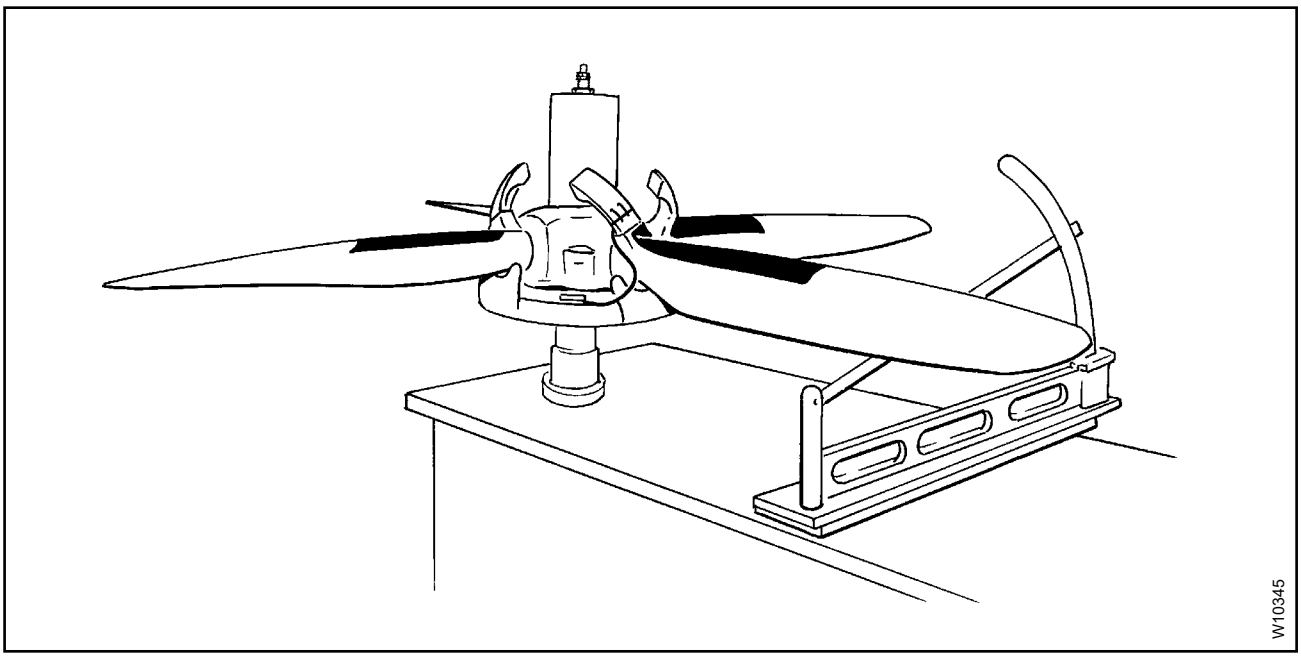
(a) Relieve the pressure from the propeller.

(b) Turn the pitch adjust sleeve unit (280) clockwise to decrease the amount of negative pitch or counterclockwise to increase the amount of negative pitch.

NOTE: One full turn of the pitch adjust sleeve unit equals approximately five degrees.

(5) After adjustment, repressurize the propeller, and recheck the reverse angle.

(6) When the correct reverse angle has been established in all four blades, turn the drilled hex nut (60) on the pitch adjustment sleeve unit (280) against the cylinder (90).



Checking Blade Angles with the Bench Top Protractor TE96
Figure 7-42

CAUTION: DO NOT PERMIT THE PITCH ADJUST SLEEVE UNIT (280) TO ROTATE WHEN TORQUING THE DRILLED THIN HEX NUT (60).

(7) While holding the pitch adjust sleeve unit (280) to prevent rotation, torque the drilled thin hex nut (60) against the cylinder in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(8) Cycle the propeller to feather and back to reverse.

(9) Measure the reverse blade angle.

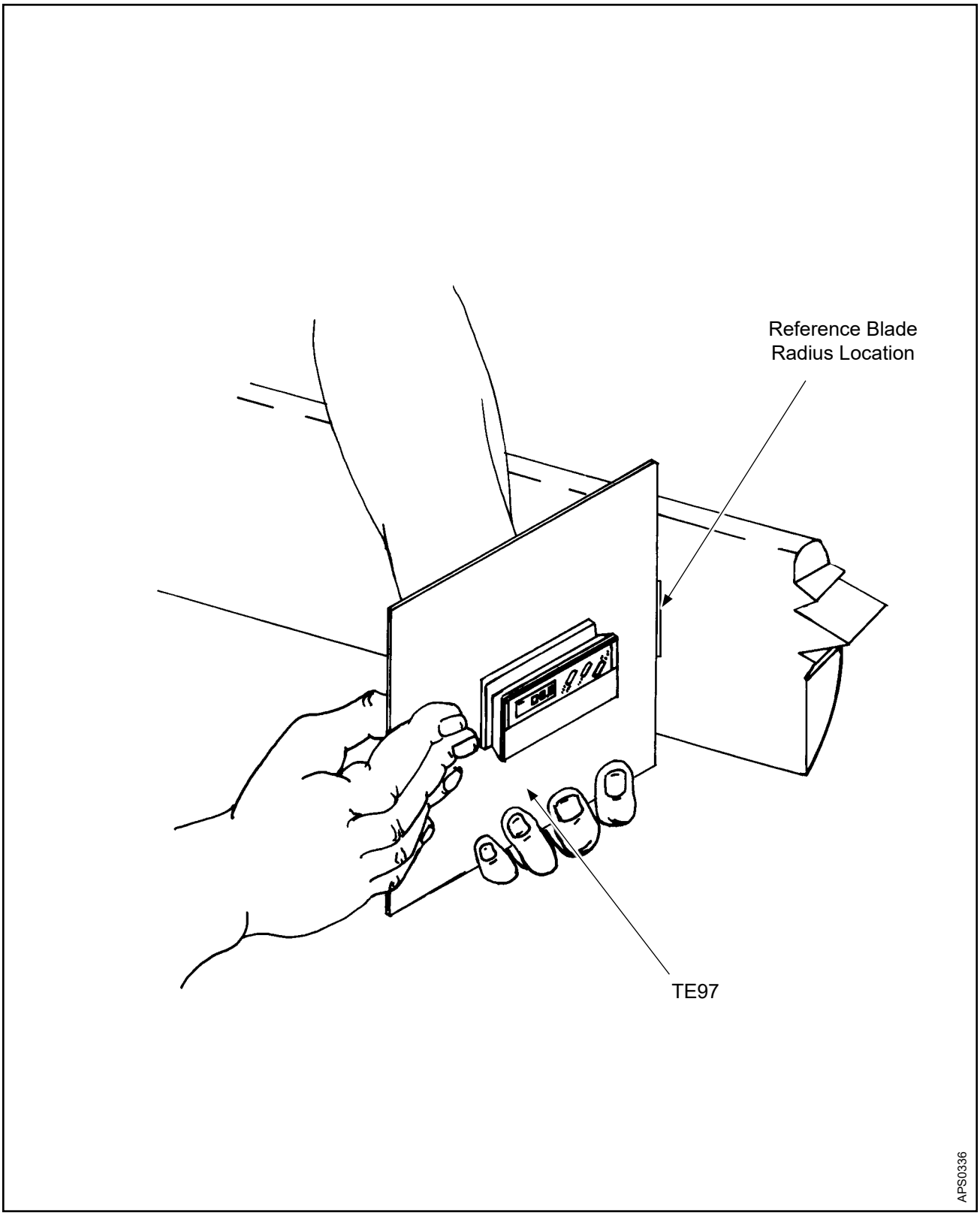
(a) If the angle is incorrect, loosen the drilled hex nut and repeat steps 2.K.(4) through 2.K.(9) in this chapter.

(b) When the reverse blade angle is correct, continue to the next step.

(10) Install the corrosion resistant washer (110) and fillister head screw (100) into one of the holes provided in the cylinder (90) and tighten.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the drilled thin hex (60) nut and fillister head screw (100).

(11) Using 0.032 inch (0.81 mm) minimum diameter stainless steel wire, safety wire the drilled thin hex nut (60) to the fillister head screw (100).



Checking Feathering Angle with Protractor TE97
Figure 7-43

L. Setting the Feather Blade Angle

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Application Guide Manual 159 (61-02-59) for the specific feather blade angle and reference blade radius required.

CAUTION: TO ACHIEVE THE CORRECT FEATHER BLADE ANGLE, THE THIN HEX NUT (50) MUST CONTACT THE SHOULDER OF THE PITCH ADJUST SLEEVE UNIT (280).

(2) Release all air pressure from the propeller.

(3) Install the thin hex nut (50) on the pitch change rod (430) and turn until it bottoms against the pitch adjust sleeve unit (280).

(4) Apply air pressure to the propeller to move the pitch change rod (430) and the thin hex nut (50) off of the pitch adjust sleeve unit (280).

(5) Turn the nut (50) clockwise approximately five (5) turns to provide a starting point for feather blade angle adjustment.

(6) Release the air pressure from the propeller and permit the thin hex nut (50) to rest on the pitch adjust sleeve unit (280).

(7) Remove the play from the blades by pushing the counterweight or counterweight clamp toward feather.

(8) Using a protractor TE96, TE97, or equivalent, measure the feather angle of blade number one at the appropriate reference blade radius. Refer to Figure 7-43.

(9) If the feather blade angle is not correct, apply enough air pressure to the propeller to move the pitch change rod (430) and thin hex nut (50) off the pitch adjust sleeve unit (280).

(10) Adjust the feather blade angle by turning the small nut (50) on the pitch change rod.

NOTE: One full turn of the small nut equals approximately five (5) degrees.

(a) To decrease the angle, turn the small nut (50) clockwise.

(b) To increase the angle, turn the small nut (50) counterclockwise.

(11) When the correct feather angle is established for all four blades, install a second thin hex nut (40).

CAUTION: THE THIN HEX NUT (50) MUST NOT MOVE WHEN TORQUING THE THIN HEX NUT (40) AGAINST THE THIN HEX NUT (50).

(12) Torque the thin hex nut (40) against the first thin hex nut (50), in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(13) Cycle the propeller to reverse and back to feather.

(14) Measure the feather blade angle.

(a) If the angle is incorrect, loosen the thin drilled hex nut (40) and repeat steps 2.L.(8) through 2.L.(13) in this chapter.

(b) When the feather blade angle is correct, continue to the next step.

(15) After torquing the drilled thin hex nuts (40, 50), recheck the feather blade angle.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the drilled thin hex nuts (40, 50).

(16) Using 0.032 inch (0.81 mm) minimum diameter stainless steel wire, safety wire the two thin hex nuts (40,50) together for safety.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install the hex head bolt (420), washer (410) and nut (400).

(17) Install the hex head bolt (420) through the hole in the pitch change rod (430) and the slot in the pitch change rod plug (70).

(18) Install the washer (410) and nut (400) on the hex head bolt (420).

(19) Hold the hex head bolt (420) to keep it from turning and torque the nut (400) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

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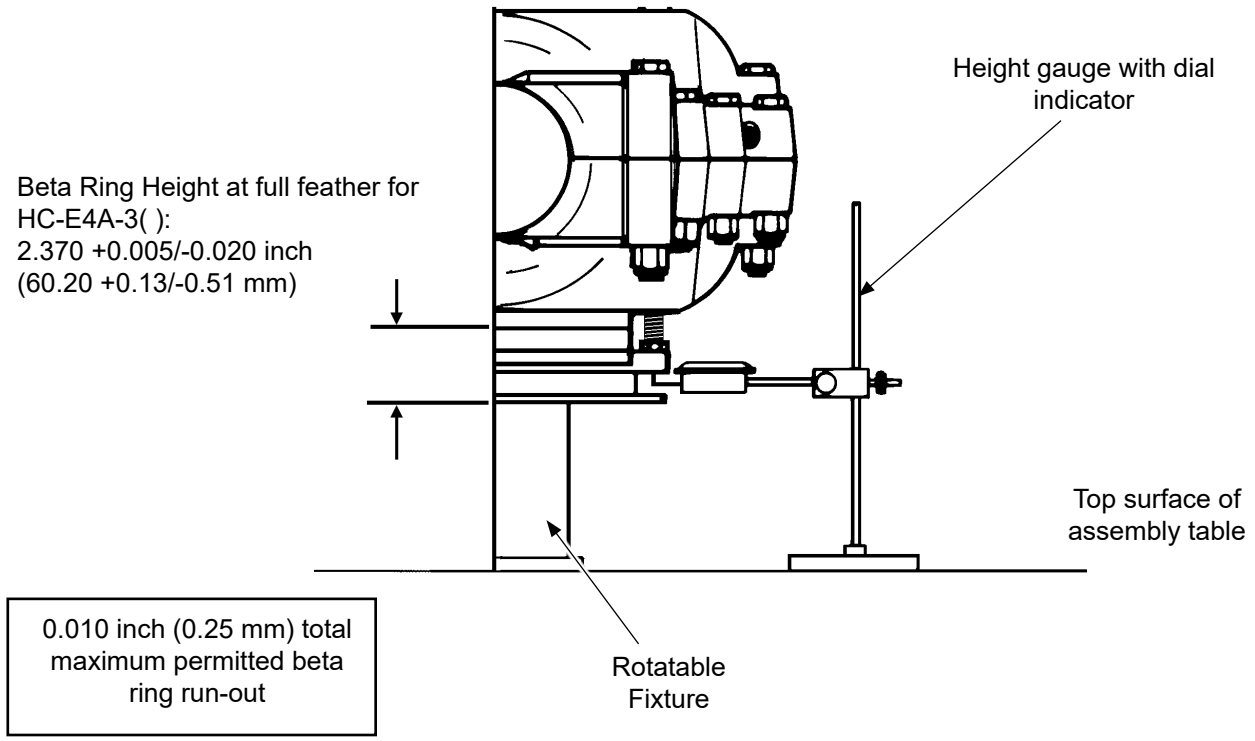


NOTE 1: Beta ring height dimension is from engine flange-to-propeller flange interface to engine side of Beta ring.

NOTE 2: Check beta ring run-out with beta ring engaged by the beta system and check the beta ring run-out with the beta ring disengaged from the beta system.

HC-E4A-3( ) Beta Ring Height and Run-out Check
Figure 7-44

M. Beta System Assembly

CAUTION: INSTALL THE SPINNER BULKHEAD/DE-ICE SLIP RING BEFORE ASSEMBLING THE BETA SYSTEM COMPONENTS.

(1) Install the beta rods (750) through the beta rod holes in the cylinder-side hub (450) half.

(2) Install a thin hex nut (820) onto the engine side of each beta rod (750).

(a) Optionally, use the spring installation tool TE658 to compress the beta compression spring (800) when installing the hex nuts (820). Refer to the section, "Using the Spring Installation Tool" in this chapter.

CAUTION: ROTATE THE BETA RODS (750) ALTERNATELY NO MORE THAN TWO FULL TURNS AT A TIME TO AVOID WARPING THE BETA RING (840).

(3) Engage the flats on the beta rods (750) on the cylinder (90) side of the hub (450) and turn the beta rods (750) into the beta ring (840) threaded holes.

(4) Rotate each beta rod (750) to the bottom of each beta ring (840) threaded hole and then unthread each beta rod one thread.

(5) Put a beta spring (800) and beta sleeve (790) on each beta rod (750) on the cylinder-side of the hub (450).

(6) Apply anti-seize compound CM118 to the beta sleeve (790) threads.

CAUTION: DO NOT CROSS THREAD THE BETA SLEEVE (790) AND HUB (450) THREADS WHEN INSTALLING THE BETA SLEEVE INTO THE HUB.

(7) Compress the beta spring (800) by pushing on the beta sleeve (790) and rotate the beta sleeve into the threads in the hub (450). Tighten until snug.

(8) Using a depth micrometer, measure the height of the beta ring (840).

(a) Adjust the height by rotating the beta rods (750) clockwise to decrease or counterclockwise to increase.

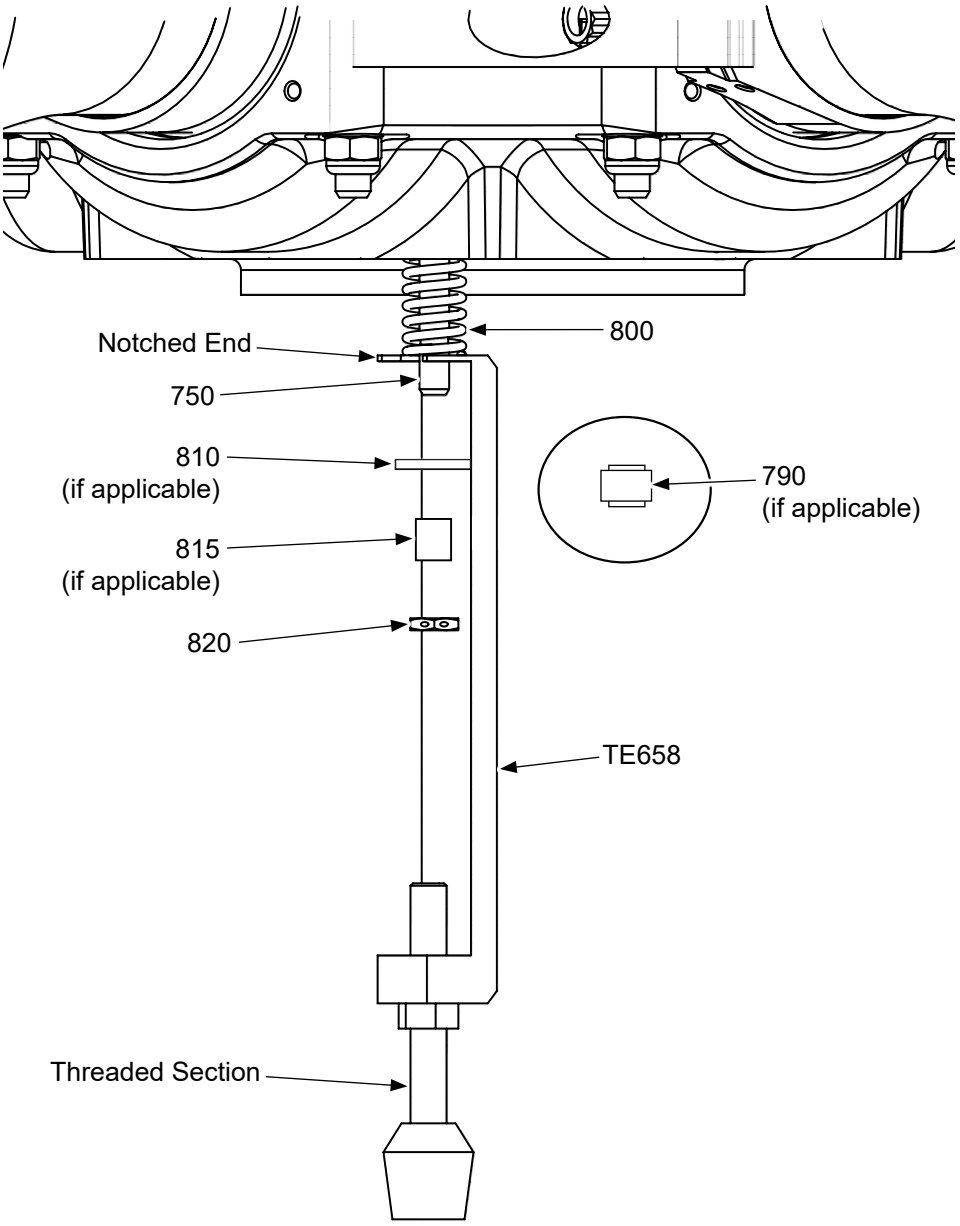
(9) Using a dial indicator, check the run-out of the beta ring (840). Refer to Figure 7-44.

(a) Beta ring run-out must be within the limits shown in Figure 7-44.

(10) While holding the beta rods (750) to prevent rotation, tighten the thin hex nuts (820) against the beta ring (840).

(11) Torque the thin hex nuts (820) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(12) Recheck the run-out and the height of the beta ring and correct as necessary. Refer to Figure 7-44.



Spring Installation Tool
Figure 7-45

(13) Install one thin hex nut (30) on the forward end of each beta rod (750).

NOTE: The thin hex nut (30) is positioned near the beta sleeve (790) to clear other parts that will be installed later.

(14) Install a yoke bushing (200) on each yoke tappet (210).

(15) Put the yoke bushing (200) and the yoke tappet (210) in position on the cylinder (90).

(a) Secure both yoke tappets by putting the beta yoke (20) over both yoke tappets (210).

(b) Align the holes in the beta yoke with the beta rods and slide the yoke over the beta rods (750).

(16) Install two screws (220) in each yoke tappet (210) and torque in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

N. Using the Spring Installation Tool

(1) Put the notched end of the spring installation tool TE658 onto the beta rod (750) to compress the beta compression spring (800). Refer to Figure 7-45.

(2) Adjust the threaded section of the spring installation tool TE658 as necessary to compress the beta compression spring (800) until the threads on the beta rod (750) are exposed.

(3) Install the washer (810), spacer (815), or spring guide (790) as applicable, then install the drilled thin hex nuts (820).

(4) Remove the spring installation tool TE658 from the beta rod, then complete the assembly steps in the applicable procedure.

O. Setting Low Pitch

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Application Guide Manual 159 (61-02-59) for the specific low pitch blade angle and reference blade radius required.

(2) Pressurize the propeller to the low pitch blade angle. Lock the air pressure into propeller to maintain angle.

NOTE: Low pitch is obtained when contact between the forward piston surface and yoke tappet occurs. With the propeller at low pitch, the yoke tappet will be lifted off the cylinder slots by the piston.

(3) With the propeller at low pitch, install the forward thin hex nuts (10) on each beta rod (750) until each thin hex nut contacts the beta yoke (20) flange.

(4) Turn the thin hex nuts (10, 30) forward until they are against the beta yoke (20) flange.

(5) Torque the thin hex nuts (10, 30) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(6) Release and reapply air pressure to move the propeller blades to the low pitch position.

(7) Recheck the low pitch angle and readjust beta rod (750) position in the beta yoke (20) if required, repeating previous steps.

(8) Apply 200 psi air pressure to propeller.

(9) Check the run-out of the beta ring with propeller in full reverse. Maximum permitted run-out is 0.010 inch (0.25 mm).

(10) Correct if necessary by readjustment of the thin hex nuts on the beta yoke.

(11) Recheck low pitch and correct as necessary.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the drilled thin hex nuts (10, 30).

(12) Safety thin hex nuts (10, 30) to each other with 0.032 inch (0.81 mm) stainless steel wire at four locations.

P. Beta Feedback Block Reassembly

(1) Put the carbon block unit (870) in the yoke unit (880) and align the holes in the yoke unit with the through hole in the carbon block unit.

(2) Install the clevis pin (900) through one yoke unit (880) hole, through the carbon block unit (870), and out the opposite yoke unit hole.

(3) Install the cotter pin (890) through the hole in the clevis pin (900).

(4) The external snap ring (860) will be installed at the installation of the beta feedback block assembly onto the aircraft.

(5) Refer to the Fits and Clearances chapter of this manual for the installation of the beta feedback block assembly onto the aircraft.

Q. Propeller Lubrication

(1) Lubricate the propeller in accordance with the Propeller Lubrication chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

R. Static Balance

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the static balance weight screws (1110).

(1) Perform static balance of propeller in accordance with the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

S. Label Placement

(1) For information about label use, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

3. Assembly of HC-( )4(N,P)-3( ) and HC-E4W-3( ) Propeller Models

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: ACTUATION OF PROPELLERS MUST BE ACCOMPLISHED USING EITHER COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE, OR NITROGEN.

CAUTION 3: DO NOT EXCEED A PRESSURE OF 200 PSI (13.78 BARS) WHEN ACTUATING PROPELLERS COVERED IN THIS MANUAL.

CAUTION 4: USE SUFFICIENT PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

A. Hub Assembly Procedures

(1) Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for assembly procedures of the hub unit before following the propeller assembly procedures in this manual.

CAUTION: MAKE SURE THAT THE FOUR HUB MOUNTING PLATES (446) ARE INSTALLED IN THE CORRECT LOCATIONS.

(2) For propeller model HC-E4N-3KA(Y), HC-E4N-3KTVY, HC-E4N-3K(U), HC-E4P-3K, and HC-E4W-3KD, install the hub mounting plates (446) and the mounting bolts (447).

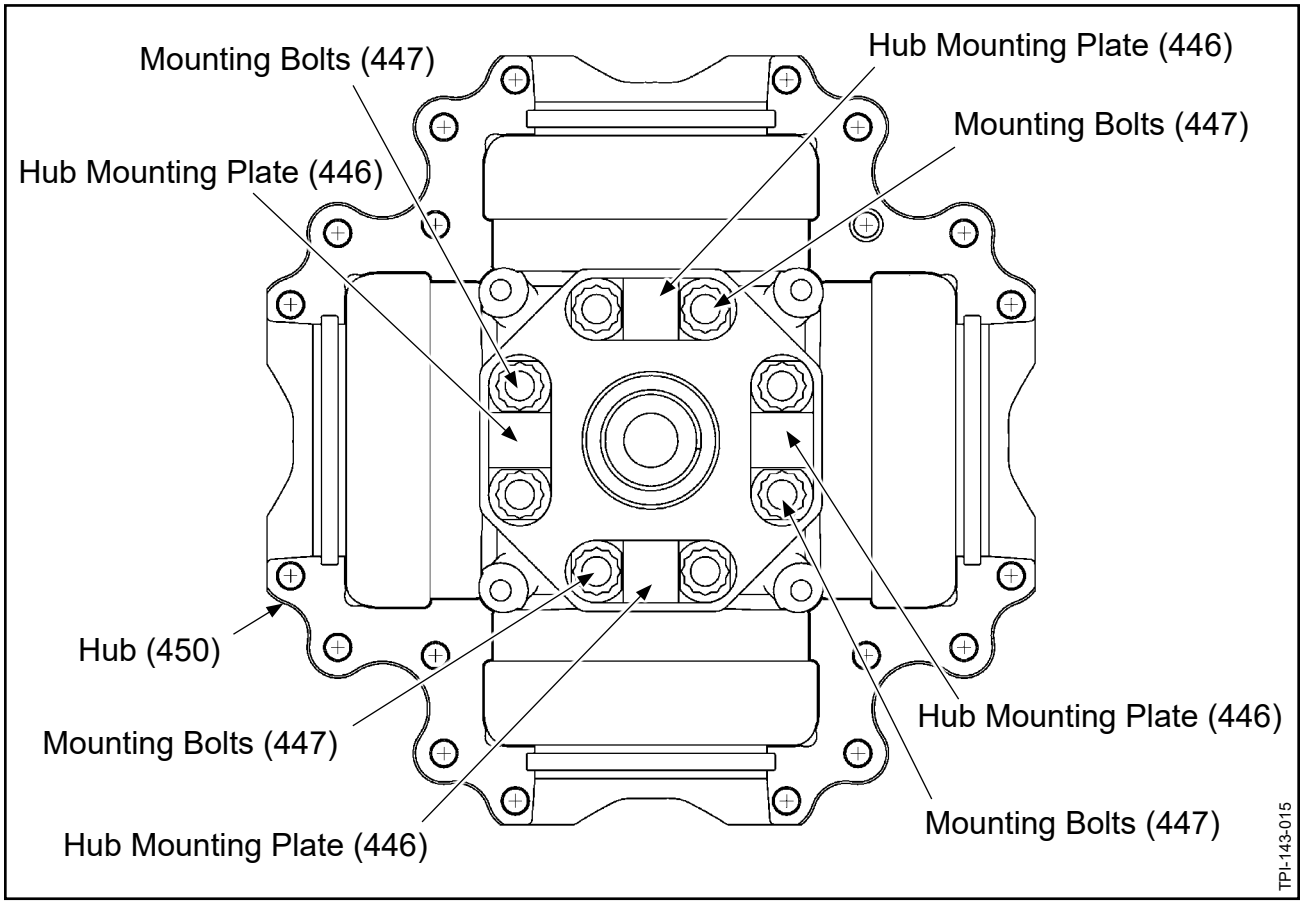
(a) Put the four hub mounting plates (446) shoulder side up in the engine-side half of the hub (450), aligning the mounting holes in the hub mounting plates with the mounting holes in the hub.

1 Make sure that the four hub mounting plates (446) are installed in the locations shown in Figure 7-46.

(b) Align the mounting bolts (447) with the mounting holes in the hub mounting plates (446) and the mounting holes in the hub (450).

(c) Press the mounting bolts (447) into the hub (450) until the mounting bolts are tight against the hub mounting plates (446).

1 A 0.002 inch feeler gauge must not fit between the hub mounting plates (446) and the mounting bolts (447).



Installing the Hub Mounting Plates
Figure 7-46

(3) Install a new pitch change rod O-ring (460) in the cylinder-side hub half (450). Refer to Figure 7-1.

(4) Install a new pitch change rod O-ring (560) in the engine-side half of the hub (450). Refer to Figure 7-1.

(5) Install an O-ring (770) into the groove provided in each beta spring retainer (780).

(6) Install a beta spring retainer (780) into each beta system hole in the engine-side half of the hub (450). Refer to the Bonding of B-454 Beta Spring Retainer section, in the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(7) Install the two backup rings (760) into each beta system hole in the cylinder-side hub (450) half.

(8) Install the O-ring (1130) on the rotatable fixture to seal between the hub and rotatable fixture. Refer to Figure 7-2.

(9) Install and secure the engine-side hub half on the rotatable fixture on the propeller assembly table TE129. Refer to Figure 7-3.

CAUTION: THE BOLT GAP IS NECESSARY FOR THE PROPER DISCHARGE OF ANY LIGHTNING CHARGE INTO THE HUB.

(10) Lightning conductor bolt (610) installation **(HC-E4N-3M only)**. Refer to Figure 7-4.

(a) Install the bolt (610) into the balance weight hole in the engine-half of the hub unit.

1 Install the bolt in the hole that most closely aligns with the blade trailing edge on the engine-half of the hub unit. Refer to Figure 7-4, Lightning Conductor Bolt (610) Only Configuration.

2 Insert the bolt as far as the threads will permit, but do not tighten.

(b) If the lightning conductor bolt (610) is removed for any reason, discard the bolt and replace it with a new bolt.

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B. Blade Assembly Procedures

(1) General

(a) The following procedure assumes that the blade has been inspected, reworked, and repaired and that the blade bore plug, blade bore bearing, counterweight or counterweight clamp, and blade thrust bearings are installed in accordance with Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33) or Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

(2) Installing the Dowel Pin (940)

(a) If the dowel pin (940) has been removed, press the chamfered end of the dowel pin (940) into the pitch change knob bracket (950) leaving 0.415 ± 0.025 inch (10.54 ± 0.63 mm) of the dowel pin (940) exposed. Refer to Figure 7-5.

(3) Lubricating the cam follower (960).

NOTE: The cam followers (960) are shipped from Hartzell Propeller Inc. greased with approved lubricant.

(a) Lubricating of the cam follower (960) is not necessary if one of the following two criteria are met:

1 It has been less than two (2) years from the date marked on the packaging by Hartzell Propeller Inc.

2 It has been less than one (1) year from the date of receipt if there is no date marked on the packaging.

(b) If none of the above criteria are met, complete the following lubrication procedure:

1 Using solvent CM23, flush the grease from the cam follower (960).

2 Using lubricant CM12, lubricate the cam follower (960).

(4) For a pitch change knob bracket that uses a swaged washer (970) to retain the cam follower (960), install the cam follower (960) on the pitch change knob bracket (950) using the following steps:

(a) Slide the cam follower onto the pitch change knob bracket (950).

CAUTION: PRESS THE KNOB UNIT RETAINING WASHER, COUNTERSUNK SIDE DOWN, EVENLY AGAINST THE SHOULDER OF THE PITCH CHANGE KNOB BRACKET. THE KNOB UNIT RETAINING WASHER MUST BE COMPLETELY SEATED ON THE PITCH CHANGE KNOB BRACKET.

(b) Press the washer (970), bevel down, onto the top of the pitch change knob bracket (950). Refer to Figure 7-6.

1 The knob unit retaining washer is completely seated on the pitch change knob bracket when the pitch change knob bracket extends slightly through the top of the knob unit retaining washer. Refer to Figure 7-7.

(c) Swage the end of the pitch change knob bracket.

CAUTION: DIMPLES CAUSED BY SWAGING MUST NOT CONTACT PREVIOUS DIMPLES. THERE MUST BE AN UNSWAGED AREA BETWEEN THE SWAGE DIMPLES.

1 Using sufficient force and a locally fabricated swage tool, swage the end of the pitch change knob bracket two places 180 degrees apart to force a small amount of material over the edge of the knob unit retaining washer. Refer to Figure 7-8 and Figure 7-9.

(d) After assembly of the parts, perform the following pull test:

1 Hold the pitch change knob bracket firmly in one hand.

2 Grip the cam follower firmly in the other hand.

3 Firmly pull on the cam follower to test the integrity of the interference fit between the knob unit retaining washer and the swaging to the pitch change knob.

4 If the knob unit retaining washer remains firmly in position on the pitch change knob bracket, continue the propeller assembly process.

5 If the knob unit retaining washer does not remain firmly in position on the pitch change knob bracket, perform the following:

a Discard the knob unit retaining washer.

b Reassemble a pitch change knob bracket, a cam follower, and a new knob unit retaining washer, using new or overhauled parts as necessary, in accordance with the applicable steps in this manual. Swage the pitch change knob bracket in accordance with Paragraph 3.B.(e).

c Repeat the pull test in accordance with Paragraph 3.B.(f).

d If the knob unit retaining washer does not remain firmly in position on the pitch change knob bracket, measure the knob unit retaining surface of the pitch change knob bracket. If the OD is less than the serviceable limits as specified in the Check chapter of this manual, discard the pitch change knob bracket.

e Report to Hartzell Propeller Inc. each occurrence of a pitch change knob bracket that is less than the serviceable limits specified.

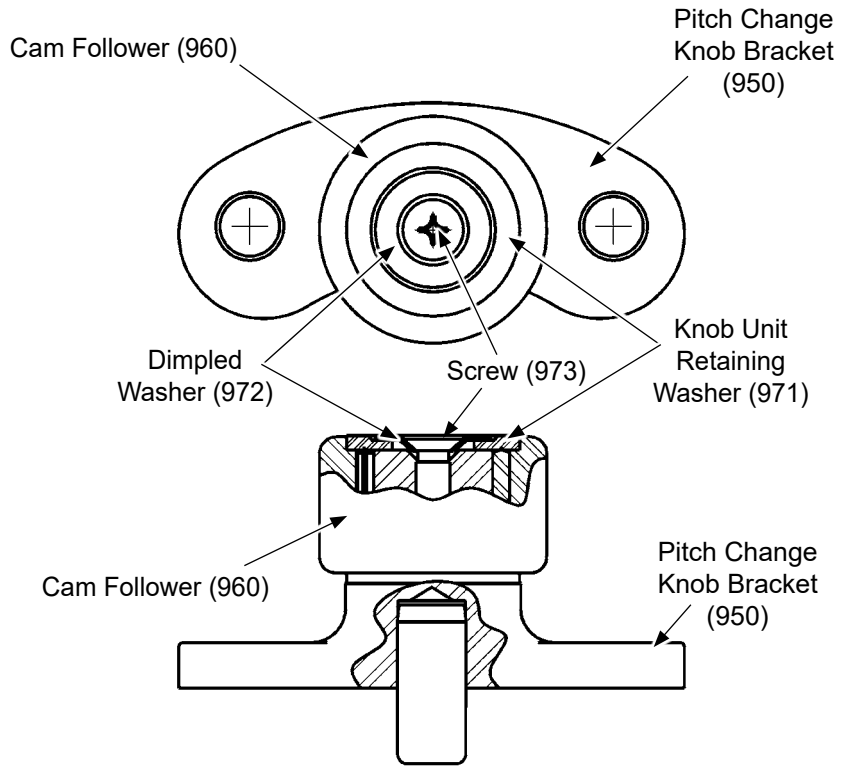
(e) After assembly of the parts, perform the following turn test:

1 Grip and turn the cam follower (960) on the pitch change bracket (950).

a If the cam follower (960) turns freely on the pitch change bracket (950), continue the propeller assembly process.

b If the cam follower (960) does not turn freely on the pitch change bracket (950), replace the cam follower in accordance with steps 2.B.(3)(a) through 2.B.(4)(d). Repeat the pull test and the turn test until the results are satisfactory.

(f) Repeat step 2.B.(3)(a) through 2.B.(4)(e) for each of the remaining pitch change knob brackets (950).



Assembly of the Pitch Change Knob Unit That Uses a Screw
Figure 7-47

(5) For a pitch change knob bracket that uses a screw to retain the cam follower (960), install the cam follower on the pitch change knob bracket (950), using the following steps. Refer to Figure 7-47.

(a) Using solvent CM106 MEK or CM219 MPK, clean the threads in the top of the pitch change knob bracket (950) and the threads of the screw (973).

(b) Permit the threads to dry.

(c) Apply threadlocker CM21 to the clean, dry threads in the top of the pitch change knob bracket (950).

(d) Put the cam follower (960) on the pitch change knob bracket (950).

(e) With the counterbored side up, put the knob unit retaining washer (971) on the end of the pitch change knob bracket (950).

(f) With the raised side down, put the the dimpled washer (972) on the knob unit retaining washer (971).

(g) Examine the knob unit retaining washer (971) and the dimpled washer (972) on the pitch change knob bracket (950) to make sure that the parts are seated correctly.

(h) Apply threadlocker CM21 to the clean, dry threads of the screw (973).

(i) Using the screw (973), attach the knob unit retaining washer (971) and the dimpled washer (972) to the pitch change knob bracket (950).

(j) Torque the screw (973) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(k) Repeat step 3.B.(5)(a) through 3.B.(5)(j) for each of the remaining pitch change knob brackets (950).

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(6) Installation of the Pitch Change Knob Unit - Refer to Figure 7-10

(a) Make sure that the surfaces of the butt of the blade and the pitch change knob unit (930) are clean and free of oil, dirt, and other foreign materials.

(b) Put the pitch change knob unit (930) onto the butt of the blade.

(c) Line up the holes in the pitch change knob unit (930) with the threaded holes in the butt of the blade.

(d) Using a mallet, tap the pitch change knob bracket (950) until it is firmly against the butt of the blade.

1 Use the alternate pitch change knob unit (930) choices as necessary to bring the floating pitch angle of all four blades within the specified tolerance of ±0.1 degree. Refer to the pitch change knob unit (930) selection data in Table 7-1.

(e) **For propeller models HC-E4W-3( ) and HC-(D,E)4(N,P)-3( ) except HC-E4N-3A, HC-E4N-3KA(Y)**, **HC-E4N-3KTVY, and HC-E4N-3M**:

1 Refer to Figure 7-10, View A.

2 Install the 1/4-28 12 point bolts (920).

3 Torque each bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Using rubber silicone tubing (925) if applicable, safety wire the bolts (920) in accordance with NASM33540.

(f) **For propeller models HC-E4N-3M and HC-E4N-3KA(Y)**:

1 Refer to Figure 7-10, View B.

2 Install the 12 point bolts (920).

3 Torque each bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Safety wire the bolts (920) to the hole in the pitch change knob bracket (950) in accordance with NASM33540.

(g) **For propeller model HC-E4N-3A and HC-E4N-3KTVY**:

1 Refer to Figure 7-10, View C.

2 Install the hex head bolts (920).

3 Torque each hex head bolt (920) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

4 Safety wire the hex head bolts (920) together in accordance with NASM33540 using the following steps:

a Using a piece of safety wire long enough to safety wire the bolts (920) together, safety wire one hex head bolt (920).

b Put the length of safety wire through the silicone rubber tubing (925).

c With the silicone rubber tubing (925) in the position shown in Figure 7-10, View C, safety wire the second bolt (920).

(h) Repeat the applicable steps 3.B.(3)(a) through 3.B.(6)(g) for the remaining blades.

(7) Blade Seal Assembly Installation, E-shank blades only - Optional

CAUTION: THE B-7071 BEARING RETAINING RING MUST BE INSTALLED WHEN USING THIS BLADE SEALING METHOD.

(a) Assemble the blade seal (1035) and O-ring (1036). Refer to Figure 7-11, "A".

CAUTION: DO NOT OVER STRETCH OR TWIST THE O-RING (1036) DURING INSTALLATION.

1 Install the blade seal (1035) on the butt of the blade with the recessed area of the blade seal facing away from the bearing retaining ring (1030). If the blade seal stretches, replace the blade seal.

NOTE: Initially installing the blade seal with the recessed area facing away from the bearing retaining ring will make it easier to install the O-ring onto the blade seal. An optional method is to pre-assemble the blade seal assembly on an unserviceable blade butt, or equivalent fixture.

2 Install the O-ring (1036) into the recessed area of the blade seal (1035). If the O-ring does not remain in place, replace the blade seal.

3 Remove the blade seal assembly from the butt of the blade.

CAUTION 1: DO NOT USE EXCESSIVE FORCE THAT MIGHT DAMAGE THE BLADE SEAL ASSEMBLY WHEN INSTALLING THE BLADE SEAL AND O-RING ASSEMBLY ONTO THE BLADE.

CAUTION 2: THE CORRECT INSTALLATION OF THE BLADE SEAL ASSEMBLY IS CRITICAL TO THE SEAL FUNCTION AND BLADE ROTATION.

(b) Without using excessive force, reinstall the blade seal assembly onto the butt of the blade with the recessed area facing the bearing retaining ring (1030). Refer to Figure 7-12.1, "B".

(8) Installation of the blade O-ring (1090). Refer to Figure 7-11, "C".

(a) Using lubricant CM12, lubricate the blade O-ring (1090).

(b) Install the blade O-ring (1090) over the base of the blade shank.

(9) Installation of the Hub-Side Bearing Race and Bearing Balls - Refer to Figure 7-13.

(a) Using lubricant CM12, lubricate the blade-side blade bearing race (1050).

(b) Place the ball spacer (1080) on the blade-side blade bearing race (1050).

CAUTION: ALL BEARING BALLS INSTALLED IN A SINGLE BEARING MUST BE OF THE SAME GAUGE. BEARING BALLS SUPPLIED BY HARTZELL ARE OF THE SAME GAUGE.

(c) Put the bearing balls (1060) in the openings of the ball spacer (1080) on the blade-side bearing race (1050).

CAUTION: THE BEARING RACE HALVES MUST HAVE MATCHING SERIAL NUMBERS.

(d) Place the hub-side bearing race (1070) on the bearing balls (1060). Refer to Figure 7-14.

1 Install the hub-side bearing race with the parting line perpendicular to the hub parting line when installed in the hub. Refer to Figure 7-16.

C. Preload Plate Assembly

(1) Install the set screw (1010) in the preload plate (990) so the end of the set screw protruding toward the blade butt is flush with the preload plate.

NOTE: The set screw will be repositioned later to set the blade preload.

(2) Install the nut (1020) on the set screw (1010) and position the nut a short distance from the preload plate.

NOTE: Thread locking compound will be applied to the set screw (1010) between the nut (1020) and the preload plate (990) later in the build process.

(3) Put approximately one tablespoon of lubricant CM12 on top of the preload plate inner bearing ring to lubricate the blade bore bearing. Refer to Figure 7-14.

NOTE: Using this amount of lubricant will force lubrication into the blade bore bearing when the preload plate is installed on the blade.

CAUTION: THE SPLIT-BEARING RACE PARTING LINE MUST BE PERPENDICULAR TO THE HUB PARTING LINE WHEN INSTALLED IN THE HUB. REFER TO FIGURE 7-16.

(4) Install the preload plate (990) on the butt of the blade. Refer to Figure 7-14.

NOTE: To ease installation of the blade into the hub, hold the split bearing and preload plate assembly to the blade butt with the clamping tool TE24. Refer to Figure 7-15.

(5) Repeat the blade and preload plate assembly procedures for the remaining three blades.

D. Blade Installation

(1) Apply a thin film of lubricant CM12 to the hub blade retention radii of the hub and hub O-ring grooves.

CAUTION: BLADES MUST BE PRELOADED WHILE RESTING IN THE HUB SOCKET THEY WILL OCCUPY WHEN ASSEMBLED. DO NOT PRELOAD ALL THE BLADES IN THE SAME SOCKET.

(2) Install blade number one and blade number two assemblies into the sockets of the engine-side hub half. Refer to Figure 7-16.

(3) Center the slot of the preload plate (990) at the hub parting line. Refer to Figure 7-16.

(a) Position the blade knob slot in the preload plate to permit the blade to travel within the full blade angle range without restriction.

CAUTION: IMPROPER PRELOAD CAN CAUSE THE BLADES TO BE LOOSE IN THE HUB OR MAY EXERT EXCESSIVE PRESSURE THAT CAN INTERFERE WITH PITCH CHANGE MOVEMENT.

(4) Setting the blade preload.

(a) Install the cylinder-side hub half. Refer to Figure 7-17.

(b) Bolt the hub halves together using four bolts (570), four washers (590), and four self-locking nuts (600) located midway between the blades. Refer to Figure 7-17.

(c) Torque the self-locking nuts (600) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(d) On blade number one, tighten the preload set screw (1010) through the open end of the hub. Refer to Figure 7-18.

NOTE: The loose blade will become rigid in the hub as the set screw is tightened.

(e) Tighten the preload set screw (1010) until the tip of the blade stops moving vertically.

(f) Gently push on the tip of the blade to make sure the blade is properly seated in the retention socket.

(g) Loosen the set screw (1010) and retighten. When the blade tip stops moving, turn the set screw an additional 1/4 turn into the preload plate.

(h) Check the blade for free rotation. If the blade is not free, check the following:

1 Blade seal (1090) for proper fit in the hub groove.

2 The needle rollers in the blade bore bearing may be skewed. The needle rollers should be parallel to the axis of blade pitch change.

3 Blade preload may be too tight.

(i) Repeat the preload setting procedure on blade number two.

(j) Remove the four bolts (570), four washers (590), and four nuts (600).

(k) Remove the cylinder-side hub half (450).

(l) Apply one drop of thread locking compound CM21 on the threads of the preload set screws (1010) between the thin hex nut (1020) and the preload plate (990).

CAUTION: MAKE SURE TO PREVENT THE SET SCREW (1010) FROM ROTATING WHEN TORQUING THE THIN HEX NUT (1020).

(m) Torque the thin hex nuts (1020) against the preload plate (990) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(5) Using clamping tool TE24, if desired, remove blades one and two from the hub.

CAUTION: THE PARTING LINE OF THE SPLIT BEARING RACE CONTACTING THE HUB MUST BE PERPENDICULAR TO THE HUB PARTING SURFACE WHEN INSTALLED IN THE HUB.

(6) Install blades three and four in the hub and set the blade preload.

(a) Set the preload for blades three and four following the same blade installation and preload setting procedures as prescribed for blades one and two.

(7) Reinstalling blades one and two.

CAUTION: THE PARTING LINE OF THE SPLIT BEARING RACE CONTACTING THE HUB MUST BE PERPENDICULAR TO THE HUB PARTING SURFACE WHEN INSTALLED IN THE HUB.

(a) Using clamping tool TE24, if desired, install blade two into the engine-side hub half.

(b) Center the slot of the preload plate (990) at the hub parting line. Refer to Figure 7-16.

(c) Position the pitch change knob in the preload plate to permit the blade to travel the full blade angle range without restriction.

(d) Move the three blades into full reverse position.

(e) Apply thread lock CM74 to the threads of each bumper extension (690).

(f) Install the bumper extensions (690) onto the pitch change fork (680) and torque each bumper extension in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(g) Install a fork bumper (700) on each bumper extension (690).

1 Using a plastic mallet to drive the fork bumper (700) into the hole in the bumper extension.

NOTE: The fork bumper nipple is an interference fit with the hole in the bumper extension (690).

(h) Using screws (720), attach the beta pickup plate (710) to the fork (680).

NOTE: Early propellers will have four (4) different shaped individual plates for beta pickup instead of one plate . Two screws (720) are used in each beta pickup plate (710), for a total of eight screws instead of four that is used in the one-piece beta pickup. Only a fork with eight mounting holes will work in the early application.

(i) Apply anti-seize compound CM118 to the fork threads.

CAUTION: MAKE SURE THAT THE TAPER IN THE CENTER THREADED HOLE OF THE FORK UNIT (680) IS FACING TOWARD THE CYLINDER HUB HALF TO PROPERLY FIT ONTO THE PITCH CHANGE ROD (430) THAT WILL BE INSTALLED LATER.

(j) Install the fork (680) by positioning the fork slots around the pitch change knobs of the blades.

(k) Reinstall blade number one. Refer to Figure 7-16.

1 Insert the pitch change knob in the fork (680) slot, then lower the blade and blade retention bearing into the hub.

(l) Position the center of the each slot in the preload plate on the plane of the parting line of the hub.

1 Position the blade knob slot in the preload plate to permit the blade to travel within the blade angle range without restriction.

CAUTION: MAKE SURE THAT THE BLADE SEAL IS CORRECTLY ALIGNED IN THE HUB GROOVE WHEN INSTALLING THE CYLINDER-SIDE HUB HALF.

(m) Use the guide hub bushing (530) to line up the halves of the hub, and fit the cylinder half of the hub unit onto the engine half of the hub unit.

CAUTION: CHECK THE BLADE O-RING FOR BINDING OR PINCHING WHEN THE CYLINDER-SIDE HUB HALF IS INSTALLED.

(n) Install the cylinder-side hub half.

1 Position the hub half, using a rubber mallet if necessary.

(o) Positioned midway between each of the four blade sockets, install a bolt (570), washer (590), and self-locking nut (600). Refer to Figure 7-21.

(p) Torque the self-locking nuts (600) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

E. Assembling the Piston Unit C-497( ) (320)

(1) Make an inspection of the start lock piston ring (340) and the piston (330) in accordance with the check criteria of this manual.

(2) Preassemble the start lock piston ring (340) and the piston (330) before application of the adhesive to make sure that they fit together correctly.

WARNING: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

(3) Using solvent CM106 MEK, CM219 MPK, or equivalent, clean the threads on the start lock piston ring (340) and the piston (330).

(a) Let the start lock piston ring (340) and the piston (330) air dry.

(4) Apply a thin layer of removable threadlocker CM116 to the threads of the start lock piston ring (340).

(a) Make sure that the threadlocker CM116 covers the entire circumference of at least the first three threads on the start lock piston ring (340).

(5) Turn the start lock piston ring (340) into the piston (330) until the shoulder of the start lock piston ring touches the piston.

(6) Put the clamp base TE618 in a vise. Refer to Figure 3-4 in the Dissasembly chapter of this manual.

(7) Measure and make a record of the O-ring groove width "A" on the piston (330). Refer to Figure 3-3 in the Dissasembly chapter of this manual.

(a) This measurement is necessary to complete step 3.E.(13).

(8) Attach the piston unit (320) to the clamp base TE618.

(a) Install the clamp washer TE619 onto a locally procured 1 inch (25.4 mm) diameter bolt.

(b) Put the bolt with the clamp washer TE619 through the piston unit (320) and the clamp base TE618, as shown in Figure 3-4 in the Dissasembly chapter of this manual.

(c) Install a locally procured nut of the appropriate size onto the 1 inch (25.4 mm) diameter bolt.

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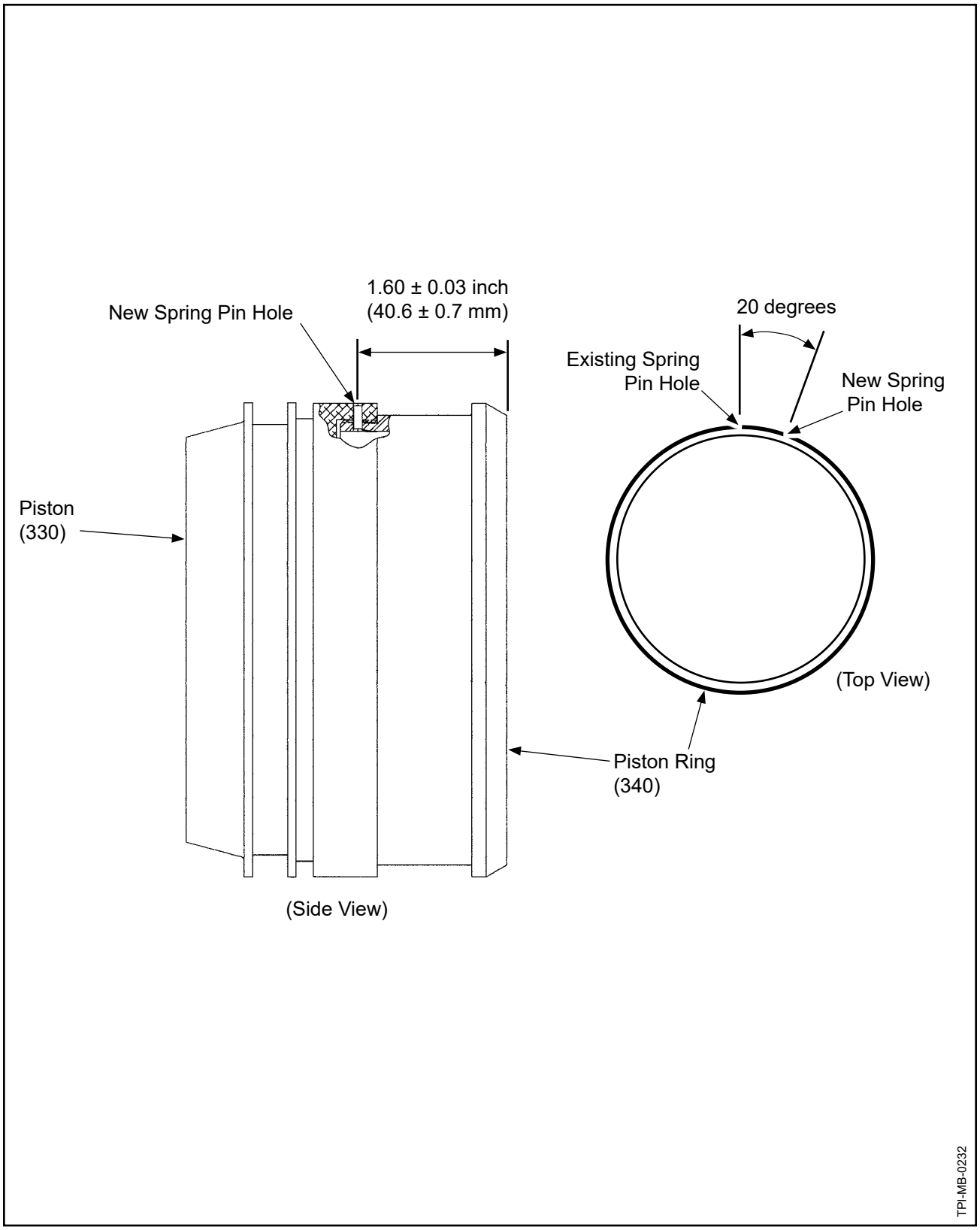


Drilling the New Spring Pin Hole for the C-497-( ) Piston Assembly
Figure 7-48

CAUTION: WHEN TIGHTENING THE NUT, THE MAXIMUM ALLOWABLE TORQUE IS 200 FT-LBS (271 N•m). OVERTIGHTENING THE NUT MAY COMPRESS THE O-RING GROOVE AND DAMAGE THE PISTON (330).

(d) Tighten the nut securely to prevent the piston unit (320) from rotating on the clamp base TE618.

(9) Install the piston ring clamp TE617 on the piston unit (320), as shown in Figure 3-4 in the Dissasembly chapter of this manual.

(10) Using a 1/2 inch drive torque wrench in the hole on the piston ring clamp TE617, apply 140 Ft-Lbs (189 N•m) of torque to the start lock piston ring (340).

(a) If an adapter is used with the torque wrench, refer to Figure 8-1 in the Fits and Clearances chapter of this manual.

(11) Remove the piston ring clamp TE617 and the clamp base TE618 from the piston unit (320).

(12) Measure and make a record of the O-ring groove width "A" on the piston (330). Refer to Figure 3-3 in the Dissasembly chapter of this manual.

(13) Subtract the width "A" measured in step 3.E.(12) from the width "A" measured in step 3.E.(7).

(a) If the difference between the two width "A" measurements is greater than 0.002 inch (0.05 mm), disassemble the piston unit (320) and retire the piston (330) in accordance with the Part Retirement chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) If the difference between the two width "A" measurements is less than or equal to 0.002 inch (0.05 mm), go to step 3.E.(14).

(14) Using a cloth dampened with solvent CM106 MEK, CM219 MPK, or equivalent, clean the piston unit (320) to remove any remaining adhesive.

(15) Let the adhesive on the piston unit (320) cure for two hours at 65°-100°F (18°-38°C).

(a) Removable threadlocker CM116 cures to handling strength in ten minutes, and full-bond strength or machining strength after two hours at 65°-100°F (18°-38°C).

(16) Drill a new spring pin hole through both the piston (330) and the start lock piston ring (340) in accordance with Figure 7-48.

(a) Hole size: 0.094 inch (2.38 mm) to 0.097 inch (2.46 mm)

(b) Hole location: 1.60 ± 0.03 inch (40.6 ± 0.7 mm) from the end of the start lock piston ring (340), and at least 20 degrees away from any existing spring pin holes.

(17) Install the spring pin (360) into the hole drilled in step 3.E.(16).

(a) Using a locally procured peening tool, peen the hole to hold the spring pin (360).

F. Hydraulic System Assembly

(1) Install the small piston O-ring (370) in the piston unit (320).

(2) Install the piston unit (320) on the pitch change rod (430).

(a) Put the piston unit installation socket TE228 in a vise. Refer to Figure 7-22.

(b) Insert the pitch change rod through the piston unit installation socket TE228, fitting the socket over the shoulder flats on the pitch change rod as shown in Figure 7-22.

(c) Slide the piston unit (320) into place against the shoulder on the pitch change rod (430). Refer to Figure 7-23.

(d) Turn the piston self-locking nut (310) onto the pitch change rod (430) until the self-locking nut locking mechanism engages the pitch change rod threads.

(3) Using the modified deep well socket TE120, torque the piston self-locking nut (310) against the piston unit (320) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual. Refer to Figure 7-24.

(4) Apply anti-seize compound CM118 to the external threads adjacent to the tapered section of the pitch change rod (430). Refer to Figure 7-25.

(5) Insert the small diameter end of the pitch change rod (420) into the cylinder-side hub (450) half and through the fork unit (700) and engine-side hub half.

CAUTION: WHEN INSTALLING THE PITCH CHANGE ROD INTO THE FORK, DO NOT EXCEED THE MAXIMUM TORQUE IN ACCORDANCE WITH TABLE 8-1 IN THE FITS AND CLEARANCES CHAPTER OF THIS MANUAL.

(6) Turn the pitch change rod (430) into the fork unit (670).

(7) Using the modified deep well socket TE120 on the self-locking hex nut (310), torque the pitch change rod (430) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(8) Move the blades by hand to make sure the blades have full range of movement from reverse pitch to feather pitch.

(a) If there is not full blade angle movement, remove the hub-clamping bolts (570) and nuts (600) and slightly separate the hub (450) halves to permit preload plate (990) rotation.

(b) Repeat the hub-clamping bolt installation procedure after the preload plates have been properly positioned.

G. Blade Angle Reference Tape Application (Optional) (Rev. 2)

CAUTION: DO NOT CONFUSE REFERENCE BLADE RADIUS WITH BLADE STATION. REFERENCE BLADE RADIUS AND BLADE STATION OF THE SAME NUMBER MAY NOT ALWAYS INDICATE THE SAME LOCATION ON THE BLADE.

(1) Reference blade radius is measured from the center of the propeller hub to a predetermined reference location on the blade for blade angle measurement.

(2) Blade stations are used during the repair or overhaul process of a blade to define a blade span location for dimensional measurement.

(3) Establish a reference blade radius location

(a) Refer to the Aircraft Type Certificate Data Sheet or the Hartzell Propeller Inc. Application Guide, Manual 159 (61-02-59), for the reference blade radius location specified for the applicable aircraft installation.

(b) Beginning with blade one, measure from the center of the propeller hub to the reference blade radius location specified. Refer to Figure 7-26.

(c) Apply a piece of reference tape CM160 to the face side of the blade at the reference blade radius location, perpendicular to the blade centerline as shown in Figure 7-26.

1 Put the reference tape CM160 on the blade so that the reference blade radius location runs through the centerline of the tape.

(d) Repeat steps (3)(b) and (3)(c) for the remaining blades in the hub assembly.

(e) Put a pattern cut-out over each piece of reference tape CM160.

(f) Spray each piece of reference tape CM160 with clear lacquer CM129 to prevent peeling.

H. Checking Blade-to-Blade Angle Tolerance

NOTE: The purpose of checking the blade angles is to verify that the blade angles of all four blades are within 0.2 degree of each other at the reference blade radius.

(1) As shown in Figure 7-27, put two blocks or spacers of equal height under the piston and on opposite sides of the pitch change rod to hold the propeller in a low blade angle position.

(2) Check the blade angle at the reference blade radius location that is indicated by the blade angle reference tape.

(a) The propeller does not have to be at the final low pitch position for this check, but the low blade angle for this check is 18 to 25 degrees.

(b) Move the blades by hand toward the high pitch position to make sure that the cam followers are properly seated against the fork.

(3) Using a protractor, check to make sure that the angle of each blade within the propeller varies no more than 0.2 degree from highest to lowest angle measurement.

(a) If the difference between the highest blade angle and the lowest blade angle is greater than 0.2 degree:

1 Replace the pitch change unit(s) on the blade(s).

a Refer to the chart, Blade Pitch Change Unit Selection, in Table 7-1 to select the appropriate pitch change bracket to increase or decrease the blade angle.

2 Recheck the blade-to-blade angle tolerance until the tolerance is achieved on all four blades.

NOTE: Each blade has tolerances for blade angles at the various blade stations. The ultimate effects of these tolerances upon vibration during operation are magnified by the blade-to-blade tolerances in the assembled propeller. Maintaining a blade-to-blade tolerance within 0.2 degree at the reference blade radius has been found to be an acceptable limit. Although not a requirement, an additional check of the blade-to-blade tolerance at the outermost blade station may be a worthwhile verification that all blades of a set are within tolerance. The difference between the highest blade angle and the lowest blade angle at the outermost station should not be greater than 0.4 degree.

(4) When the difference between the highest blade angle and the lowest blade angle is within 0.2 degree of each other, continue to the next step.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to remove the pitch change rod and the cylinder-side hub half, to install the remaining hex head bolts (570, 580), washers (590) and self-locking nuts (600), or to apply CM92 to the hub mating surfaces.

(5) Remove the pitch change rod and the cylinder-side hub half.

CAUTION: DO NOT PERMIT EXCESSIVE SEALANT TO BE SQUEEZED INTO THE BLADE RETENTION SOCKETS.

(6) Put a bead of sealant CM92 on the hub mating surfaces. Refer to Figure 7-29.

1 Sealant must contact the blade O-rings.

2 Use only enough sealant on the mating surfaces so that a small amount will be squeezed out along the entire parting surface when the hub nuts are properly torqued.

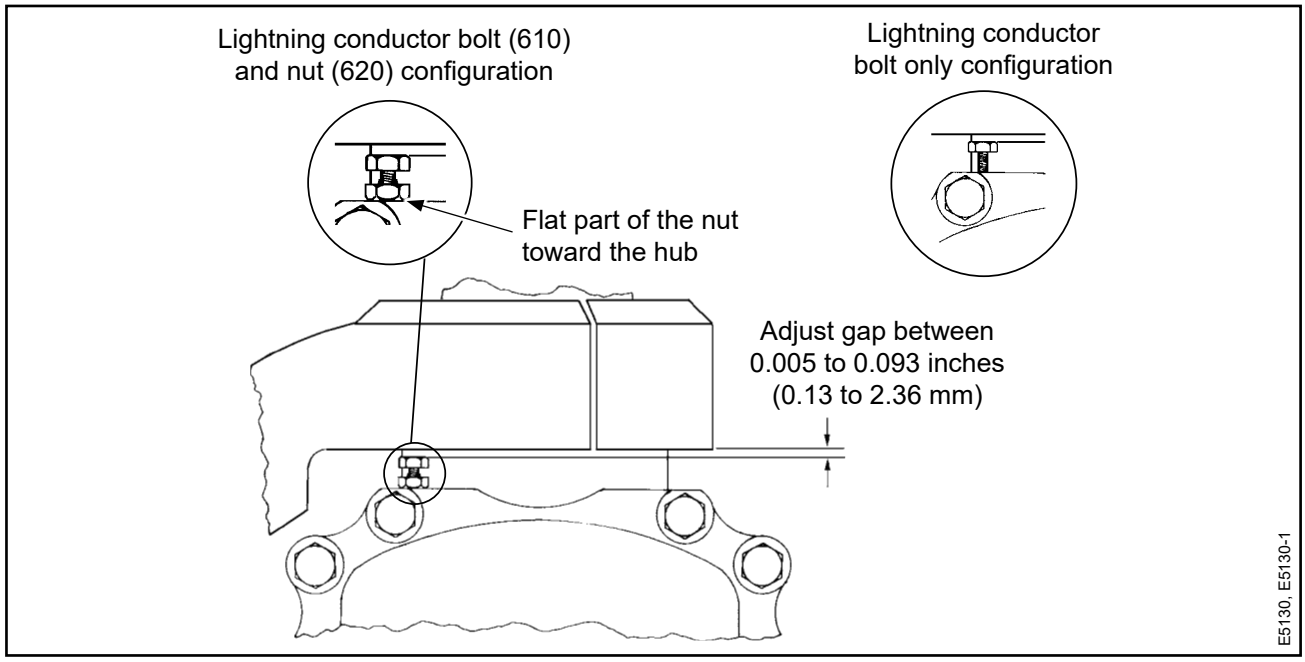
(7) Install the hex head bolts (570, 580), washers (590) and self-locking nuts (600).

(8) Torque the nuts (600) on the hex head bolts (570, 580) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

I. Lightning Conductor Bolt Gap Adjustment, if applicable.

(1) Adjust the gap between the head of the bolt (610) and the inboard surface of the blade counterweight clamp to 0.005 to 0.093 inch (0.13 to 2.36 mm). Refer to Figure 7-49.

(2) The gap must remain within the dimensions given through the entire pitch change range of the blades.



Location and Adjustment of a Lightning Conductor Bolt
Figure 7-49

J. Pitch Adjustment Unit Assembly

CAUTION: REFER TO THE APPLICABLE AIRCRAFT TYPE CERTIFICATE DATA SHEET AND/OR HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR SPECIFIC BLADE ANGLES REQUIRED.

(1) Install the piston OD O-ring (390) in the groove closest to the hub (450). Refer to Figure 7-31.

(2) Cut the necessary length of piston dust seal material (380).

(a) Cut the piston dust seal material (380) on a 30 degree diagonal so there will be an overlap at the parting line with a smoothsurface, free of fuzz. Refer to Figure 7-31, View A-A.

(3) Soak the piston dust seal (380) in aviation grade turbine engine oil until the seal is completely saturated.

(4) Squeeze the excess oil from the piston dust seal (380).

CAUTION: MAKE SURE THAT THE PISTON DUST SEAL (380) IS FREE OF FUZZ.

(5) If the piston dust seal (380) has fuzz or long strands that could interfere with O-ring operation, replace the piston dust seal.

(6) Install the thinnest section of the piston dust seal (380) in the remaining piston OD groove. Refer to Figure 7-31.

(7) Installing the cylinder.

(a) Installing the pitch adjust sleeve unit (280) into the cylinder using the sleeve installation tool TE427, or equivalent.

1 Fit the notches of the pitch adjust sleeve unit (280) into place on the bar of the sleeve installation tool TE427, or equivalent. Refer to Figure 7-32.

2 Slide the spring guide (270) over the pitch adjust sleeve unit (280) on the sleeve installation tool TE427, or equivalent until the spring guide is resting on the pitch adjust sleeve unit shoulder. Refer to Figure 7-32 and Figure 7-33.

3 Apply anti-seize compound CM118 or CM151 to both end coils of the spring (260) and the first two threads of the pitch adjust sleeve unit (280).

4 Put the feathering compression spring (260) over the pitch adjust sleeve unit (280) and spring guide (270) on the sleeve installation tool TE427, or equivalent, with the feathering compression spring resting on the lip of the spring guide (270). Refer to Figure 7-34.

5 With the raised shoulder toward the feathering compression spring (260), install the forward spring retainer (250), if applicable, over the pitch adjust sleeve unit (280) on the sleeve installation tool TE427, or equivalent. Refer to Figure 7-33.

CAUTION: DO NOT DAMAGE THE PITCH ADJUST SLEEVE UNIT (280) OR THE CYLINDER (90) THREADS WHEN INSTALLING THE CYLINDER.

6 Put the cylinder (90) over the parts on the sleeve installation tool TE427, or equivalent,, and turn the cylinder onto the pitch adjust sleeve unit (280). Refer to Figure 7-34.

7 Using four 1/4-28UNF-3A bolts or screws, attach the cylinder torque wrench adapter TE153, or equivalent, to the cylinder (90). Refer to Figure 7-35.

WARNING: MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE ASSEMBLY PROCEDURE. WHEN COMPRESSED, THE SPRING IS LOADED TO APPROXIMATELY 1000 POUNDS (454 KG) FORCE.

8 Turn the cylinder torque wrench adapter TE153, or equivalent, until the feathering compression spring (260) is fully compressed. Refer to Figure 7-35.

WARNING: USE CARE WHEN HANDLING A CYLINDER CONTAINING A COMPRESSED SPRING.

9 With the cylinder torque wrench adapter TE153 attached, remove the cylinder (90) from the sleeve installation tool TE427, or equivalent.

(b) Installing the pitch adjust sleeve unit (280) into the cylinder without the sleeve installation tool TE427, or equivalent.

1 Apply anti-seize compound CM118 or CM151 to both end coils of the spring (260) and the first two threads of the pitch adjust sleeve unit (280).

2 Install the pitch adjust sleeve unit (280) through the spring guide (270), feathering compression spring (260), and the forward spring retainer (250).

3 As shown in Figure 7-36, use a screwdriver in the slot in the pitch adjust sleeve unit (280) to thread the sleeve through the cylinder (90) far enough that a wrench can be applied to the flat surface on the end of the sleeve to continue screwing it into the cylinder until the Feathering compression spring (260) is fully compressed.

4 Using four 1/4-28UNF-3A bolts or screws, attach the cylinder torque wrench adapter TE153, or equivalent, to the cylinder (90).

(c) Install the cylinder-half hub shoulder O-ring (440). Refer to Figure 7-37.

CAUTION: DO NOT APPLY ANTI-SEIZE COMPOUND CM118 TO THE MOUNTING THREADS ON THE CYLINDER.

(d) Apply anti-seize compound CM118 to the cylinder mounting threads on the hub only.

1 Using a clean cloth, remove any excess anti-seize compound CM118 from the area above the cylinder mounting threads on the hub.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to apply CM92 around the shoulder of the cylinder half of the hub next to the O-ring.

(e) Apply a bead of sealant CM92 around the shoulder of the cylinder half of the hub next to the O-ring (440). Refer to Figure 7-37.

CAUTION 1: DO NOT DAMAGE THE CYLINDER THREADS WHEN INSTALLING THE CYLINDER (90).

CAUTION 2: DO NOT DAMAGE THE PISTON O-RING (390) WHEN INSTALLING THE CYLINDER (90).

(f) Carefully slide the cylinder (90) over the piston unit (320) onto the hub (450) threads.

CAUTION: MAKE SURE THAT THE CYLINDER THREADS ARE ALIGNED WITH THE HUB THREADS.

(g) Turn the cylinder (90) counterclockwise until the threads align.

(h) Thread the cylinder (90) onto the hub threads by hand.

(i) Using the torque wrench adapter TE153, or equivalent, torque the cylinder (90) onto the hub (450) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(j) Remove the four 1/4-28UNF-3A bolts or screws from the torque wrench adapter TE153 and cylinder (90).

(k) Remove the torque wrench adapter TE153 from the cylinder (90).

CAUTION: IF THE FEATHERING COMPRESSION SPRING (260) IS NOT IN CONTACT WITH THE PISTON, THE PISTON WILL SLAM UP ONTO THE BOTTOM OF THE FEATHERING COMPRESSION SPRING WHEN 200 PSI IS APPLIED.

(8) Using a 1-3/16 inch open end wrench, engage two of the flats on the pitch adjust sleeve unit (280) and turn it approximately 3 turns clockwise or until all resistance is eliminated to permit the feathering compression spring (260) to make contact with the piston. Refer to Figure 7-37.

(9) Install the drilled hex nut (60) on the pitch adjust sleeve unit (280).

(10) Using lubricant CM12, lubricate the O-ring (80) and install in the groove of the pitch change rod plug (70).

CAUTION: MAKE SURE THAT THE SLOT IN THE PITCH CHANGE ROD PLUG IS ALIGNED WITH THE HOLES IN THE PITCH CHANGE ROD, IF APPLICABLE.

(11) Turn the pitch change rod plug (70) in the pitch change rod (430) until the end of the pitch change rod plug is flush or slightly below flush with the end of the pitch change rod and the slot in the pitch change rod plug is aligned with the holes in the pitch change rod.

K. Blade Installation Checks

(1) Apply 200 psi (13.78 bars) air pressure to the propeller to move the blades toward low pitch until the blade tips are approximately parallel to the bench surface.

(2) Check for fore-and-aft or end play movement in each blade. Refer to the Fits and Clearances chapter of this manual for blade tolerances. Refer to Figure 7-40.

(a) If there is fore-and-aft movement in a blade, it may indicate that the blade preload is set too loose. Refer to the section, "Blade Installation" in this chapter.

CAUTION: BLADE TRACK MUST NOT VARY MORE THAN 0.12 INCH (3.0 MM) FROM HIGHEST BLADE HEIGHT TO LOWEST BLADE HEIGHT.

(3) Using a height gage, check the blade track at the tip/face of each blade. Refer to Figure 7-41. Refer to the Fits and Clearances chapter of this manual for blade tolerances.

L. Setting the Reverse Angle of the Blades

NOTE: Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Application Guide Manual 159 (61-02-59) for the specific reverse blade angle and reference blade radius required.

(1) Apply 200 PSI (13.78 bars) air pressure to the propeller to move the propeller pitch change components against the pitch adjust sleeve unit (280).

(2) Remove play from the blades by pushing the counterweight or counterweight clamp of each blade toward feather.

(3) Using a protractor TE96, TE97, or equivalent, check the reverse angle of each blade at the appropriate blade radius location. Refer to Figure 7-42.

(4) If the reverse blade angle is not correct:

(a) Relieve the pressure from the propeller.

(b) Turn the pitch adjust sleeve unit (280) clockwise to decrease the amount of negative pitch or counterclockwise to increase the amount of negative pitch.

NOTE: One full turn of the pitch adjust sleeve unit equals approximately five degrees.

(5) After adjustment, repressurize the propeller, and recheck the reverse angle.

(6) When the correct reverse angle has been established in all four blades, turn the drilled hex nut (60) on the pitch adjust sleeve unit (280) against the cylinder (90).

CAUTION: DO NOT PERMIT THE PITCH ADJUST SLEEVE UNIT (280) TO ROTATE WHEN TORQUING THE DRILLED THIN HEX NUT (60).

(7) While holding the pitch adjust sleeve unit (280), torque the drilled thin hex nut (60) against the cylinder in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(8) Cycle the propeller to feather and back to reverse.

(9) Measure the reverse blade angle.

(a) If the angle is incorrect, loosen the drilled hex nut and repeat steps 3.L.(4) through 3.L.(9) in this chapter.

(b) When the reverse blade angle is correct, continue to the next step.

(10) Install the corrosion resistant washer (110) and fillister head screw (100) in one of the holes provided in the cylinder (90) and tighten.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the drilled thin hex nut (60) and the fillister head screw (100).

(11) Using 0.032 inch (0.81 mm) minimum diameter stainless steel wire, safety wire the drilled thin hex nut (60) to the fillister head screw (100).

M. Setting the Feather Blade Angle

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) for the specific feather blade angle and blade radius required.

CAUTION: TO ACHIEVE THE CORRECT FEATHER BLADE ANGLE, THE THIN HEX NUT (50) MUST CONTACT THE SHOULDER OF THE PITCH ADJUST SLEEVE UNIT (280).

(2) Release all air (or oil) pressure from the propeller.

(3) Install the drilled thin hex nut (50) on the pitch change rod (430) and turn until it bottoms against the pitch adjust sleeve unit (280).

(4) Apply air pressure to the propeller to move the pitch change rod (430) and the drilled thin hex nut (50) off of the pitch adjust sleeve unit (280).

(5) Turn the drilled thin hex nut (50) clockwise approximately five (5) turns to provide a starting point for feather blade angle adjustment.

(6) Release the air pressure from the propeller and permit the drilled thin hex nut (50) to rest on the pitch adjust sleeve unit (280).

(7) Remove play from blades by pushing the counterweight or counterweight clamp of each blade toward feather.

(8) Using a protractor TE96, TE97, or equivalent, check the feather angle of blade number one at the appropriate blade radius. Refer to Figure 7-43.

(9) If the feather blade angle is not correct, apply enough air pressure to the propeller to move the pitch change rod (430) and drilled thin hex nut (50) off of the pitch adjust sleeve unit (280).

(10) Adjust the feather blade angle by turning the small nut (50) on the pitch change rod.

NOTE: One full turn of the small nut equals approximately five (5) degrees.

(a) To decrease the angle, turn the small nut (50) clockwise.

(b) To increase the angle, turn the small nut (50) counterclockwise.

(11) When the correct feather blade angle is established for all four blades, install a second thin hex nut (40).

CAUTION: THE THIN HEX NUT (50) MUST NOT MOVE WHEN TORQUING THE THIN HEX NUT (40) AGAINST THE THIN HEX NUT (50).

(12) Torque the thin hex nut (40) against the first thin hex nut (50), in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(13) Cycle the propeller to reverse and back to feather.

(14) Measure the feather blade angle.

(a) If the angle is incorrect, loosen the thin drilled hex nut (40) and repeat steps 3.M.(8) through 3.M.(13) in this chapter.

(b) When the feather blade angle is correct, continue to the next step.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the thin hex nuts (40, 50).

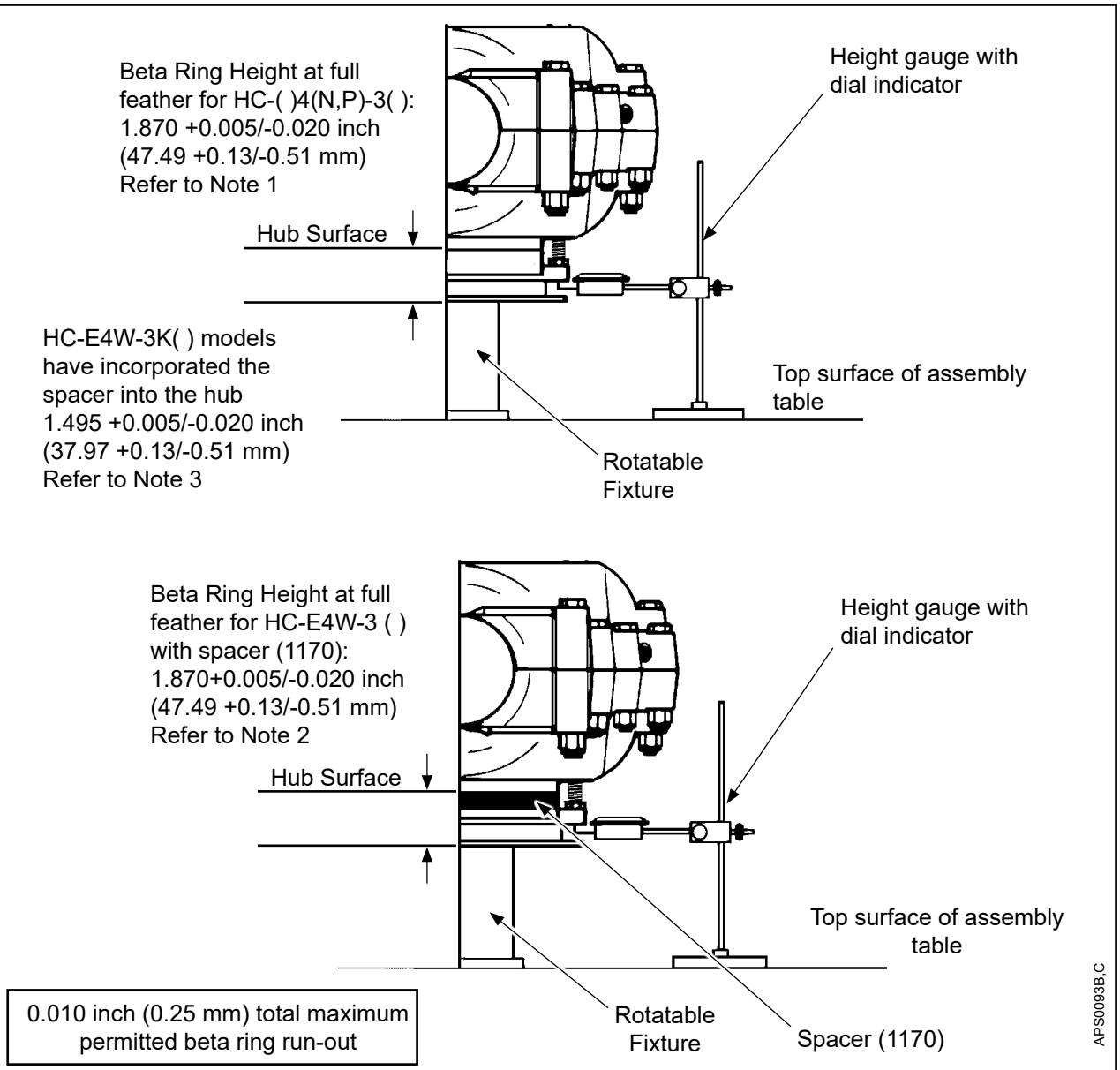
(15) Using 0.032 inch (0.81 mm) minimum diameter stainless steel wire, safety wire the two thin hex nuts (40, 50) together for safety.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install the hex head bolt (420), washer (410) and nut (400).

(16) Install the hex head bolt (420) through the hole in the pitch change rod (430) and the slot in the pitch change rod plug (70).

(17) Install the washer (410) and nut (400) on the hex head bolt (420).

(18) Torque the nut (400) on the hex head bolt (420) in accordance with Table 8-1.



NOTE 1: For propeller models HC-( )4(N,P)-3( ), beta ring height dimension is from engine flange-to-propeller flange interface to engine side of beta ring.

NOTE 2: For propeller model HC-E4W-3( ), (excluding propeller model HC-E4W-3K[ ]) beta ring height dimension is from spacer-to-propeller flange interface to engine side of beta ring.

NOTE 3: For propeller model HC-E4W-3K( ), beta ring height dimension is from engine flange-to-hub flange interface to engine side of beta ring.

NOTE 4: Check beta ring run-out with beta ring engaged by the beta system and check the beta ring run-out with the beta ring disengaged from the beta system.

HC-( )4(N,P,W)-3( ) Beta Ring Height and Run-out Check
Figure 7-50

N. Beta System Assembly

CAUTION: INSTALL THE SPINNER BULKHEAD/DE-ICE SLIP RING BEFORE ASSEMBLING THE BETA SYSTEM COMPONENTS.

(1) Install the beta rods (750) through the beta rod holes in the cylinder-side hub (450) half.

(2) Slide the beta rods (750) through the beta spring retainers (780) until a shoulder on the beta rod contacts the beta spring retainer.

(a) If the shoulder on each beta rod (750) interferes slightly with the beta pickup plate (710), move the propeller blade angle toward reverse pitch with air pressure to improve the clearance between the beta rod shoulder and beta pickup.

(b) Release the air pressure when the beta rods are in place.

(3) Install a beta sleeve (790), beta spring (800), washer (810), spacer (815) if applicable, and thin hex nut (820) onto the engine-side of each beta rod (750).

(a) Optionally, use the spring installation tool TE658 to compress the beta compression spring (800) when installing the hex nuts (820). Refer to the section, "Using the Spring Installation Tool" in this chapter.

CAUTION: ROTATE THE BETA RODS (750) ALTERNATELY, NO MORE THAN TWO FULL TURNS AT A TIME TO AVOID WARPING THE BETA RING (840).

(4) Install the beta ring (840) on the engine-side of the beta rods (750). Engage the flats on the beta rods on the cylinder (90) side of the hub (450) and turn the beta rods into the beta ring (840) threaded holes.

(5) Rotate each beta rod (750) to the bottom of each beta ring (840) threaded hole and then unthread each beta rod one thread.

(6) Using a depth micrometer, measure the height of the beta ring (840).

(1) For propeller model HC-E4W-3( ): Install the spacer (1170) before checking the run-out.

(2) Adjust the height by rotating the beta rods (750) clockwise to decrease or counterclockwise to increase.

(7) Using a dial indicator, check the run-out of the beta ring (840). Refer to Figure 7-50.

(a) Beta ring run-out must be within the limits shown in Figure 7-50.

(8) Torque the thin hex nuts (820) against the beta ring (840) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(9) Recheck the run-out and the height of the beta ring and correct as necessary. Refer to Figure 7-50.

(10) Install a beta sleeve (740) and thin hex nut (730) on the cylinder hub side of each beta rod (750).

NOTE: The beta sleeve (740) and thin hex nut (730) will be correctly positioned in the Setting Low Pitch section in this chapter.

O. Using the Spring Installation Tool

(1) Put the notched end of the spring installation tool TE658 onto the beta rod (750) to compress the beta compression spring (800). Refer to Figure 7-45.

(2) Adjust the threaded section of the spring installation tool TE658 as necessary to compress the beta compression spring (800) until the threads on the beta rod (750) are exposed.

(3) Install the washer (810), spacer (815), or spring guide (790) as applicable, then install the drilled thin hex nuts (820).

(4) Remove the spring installation tool TE658 from the beta rod, then complete the assembly steps in the applicable procedure.

P. Setting Low Pitch

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Application Guide Manual 159 (61-02-59) for the specific low pitch blade angle and reference blade radius required.

(2) Pressurize the propeller to the low pitch blade angle. Lock the air pressure into propeller to maintain the low pitch blade angle.

(3) Rotate the beta adjustment nuts into the hub until contact with the beta pickup plates is felt.

(4) Turn the thin hex nuts on the beta rod and tighten them against the beta adjustment nuts. Torque per Table 8-1 in the Fits and Clearances chapter of this manual.

(5) Release and reapply the reduced air pressure to the propeller to the low pitch position. The beta adjustment nuts and beta pickup plates should just contact. Recheck the low pitch blade angle and readjust the beta adjustment nuts if required, repeating the previous step.

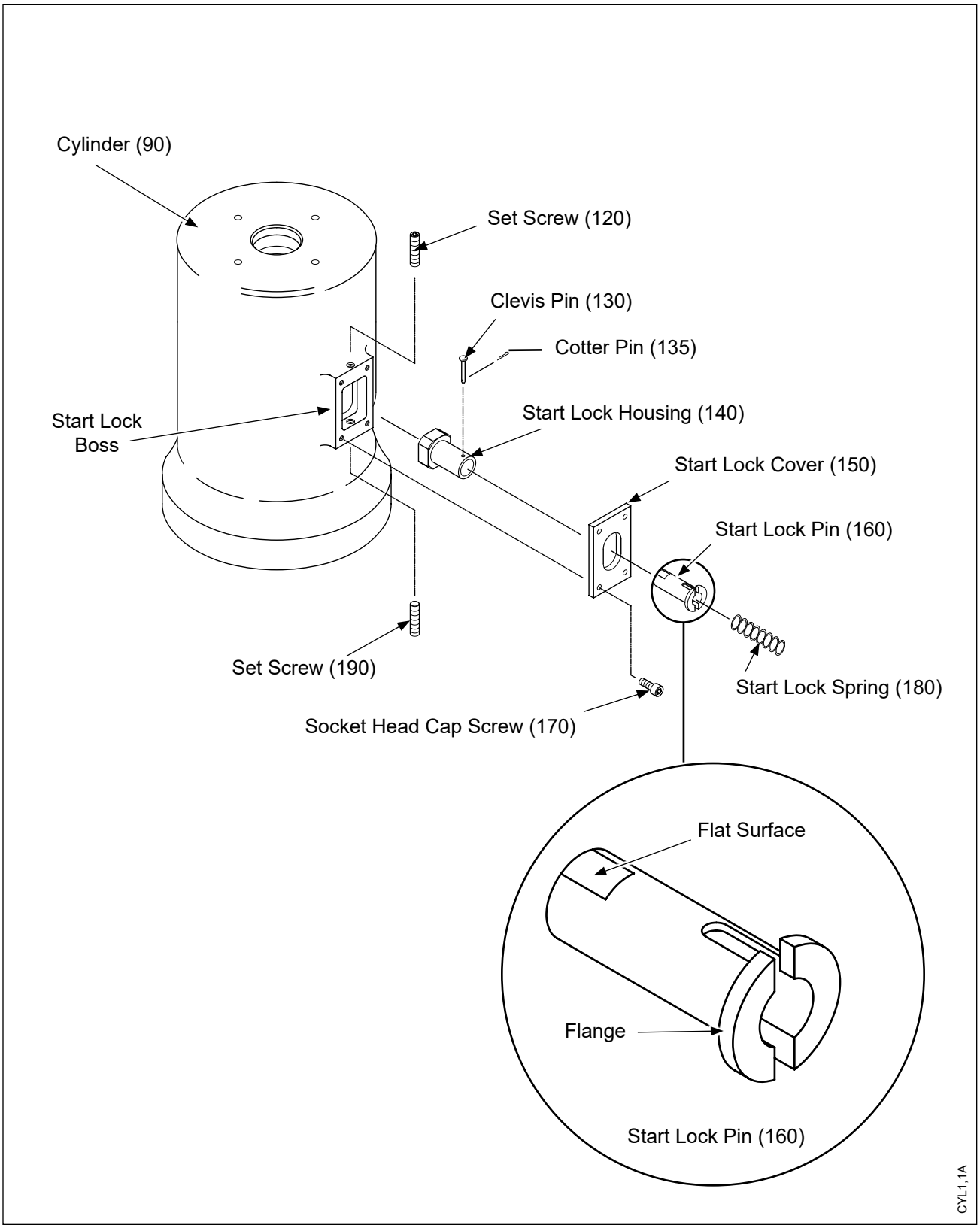
(6) Apply 200 psi (13.78 bars) air (or oil) pressure to the propeller.

(7) Check the run-out of the beta ring with the propeller in full reverse.

(a) The maximum permitted run-out is 0.010 inch (0.25 mm).

(8) Correct if necessary by readjustment of the beta nuts.

(9) Recheck the low pitch and correct as necessary.



Start Lock Assembly
Figure 7-51

Q. Start Lock Assembly - Refer to Figure 7-51

(1) Turn two set screws (190) an equal number of turns into the end of each start lock boss on the cylinder (90).

NOTE: The set screw (190) is installed on the end of the start lock boss on the cylinder that is closest to the hub.

(2) Insert one start lock housing (140) into a start lock cover (150).

(3) Slide a start lock pin (160) into the start lock housing (140).

(a) Position the flat surface of the start lock pin in the direction of the piston lip it engages. The flat surface must face away from the hub.

(4) Put a start lock spring (180) inside the start lock pin (160).

(5) Compress the start lock spring (180), and insert the cotter pin (130), or clevis pin (130) and cotter pin (135), as applicable.

CAUTION: MAKE SURE THE FLAT SURFACE ON THE START LOCK PIN (160) FACES AWAY FROM THE HUB DURING START LOCK HOUSING (140) PLACEMENT IN START LOCK BOSS.

(6) Install the squared portion of the start lock housing (140) into the channel inside the start lock boss and position the start lock cover (150) over the start lock boss.

(a) Align the four holes in the start lock cover (150) with the four threaded holes in the start lock boss for start lock cover mounting.

CAUTION: DO NOT TIGHTEN THE START LOCK COVER CAP SCREWS AT THIS TIME.

(7) Using four socket head cap screws (170), loosely fasten the start lock cover (140) to the start lock boss.

NOTE: The screws will be tightened after the start lock angle of the blades is set.

(8) Insert a 0.25 inch (6.3 mm) thick spacer between each start lock pin (160) flange and start lock housing (140).

NOTE: This will prevent interference with subsequent piston movement.

(9) Repeat the start lock assembly procedure for the other start lock.

R. Setting the Start Lock Angle of the Blades

(1) Apply 200 psi (13.78 bars) air pressure to the propeller and move the propeller blade pitch to the reverse stop.

(2) Lightly snug the socket head cap screws (170) against the start lock cover (150).

NOTE: This will hold the start lock housing (140) and the start lock pins (160) square with the cylinder (90) and make sure of correct and accurate setting of the start lock angle of the blades.

(3) Put the set screw (120) in the start lock boss so that the screw does not enter the start lock housing (140) cavity in the start lock boss.

(4) Remove the 0.25 inch (6.3 mm) thick spacers used to hold the start lock pins (160) off the start lock housings (140) while the reverse and feathering blade angles were set.

(5) Position the set screws (190) so that the same number of threads protrude from each start lock boss. Refer to Figure 7-51.

NOTE: Four threads protruding is a recommended starting location.

(6) Release the air pressure and permit the steel ring (340) on the piston (330) to engage the start lock pins (160).

(7) Pull on each start lock pin (160) to determine if each is engaging the steel ring (340) on the piston (330).

(a) If a start lock pin (160) is not engaging the steel ring (340), it will move away from the cylinder (90) when pulled.

(b) If the start lock pin moves away from the cylinder when pulled, turn the set screw (190) into the cylinder boss until the start lock pin (160) does not pull away from the cylinder.

(8) Using a protractor TE96, TE97, or equivalent, measure the start lock angle at the appropriate reference blade radius.

(9) If the start lock angle is not correct, identify the difference and apply 200 psi (13.78 bars) air pressure to the propeller and move the propeller blade pitch to the reverse stop.

(10) Adjust the location of both set screws (190) equally.

(a) Turn the set screws (190) into the start lock boss to decrease the start lock angle or out of the start lock boss to increase start lock angle.

NOTE: One full rotation of the set screw equals approximately 1.7 degrees of blade pitch change.

(11) Release the air pressure and permit the steel ring (340) on the piston (330) to again engage the start lock pins (160).

(12) Using a protractor TE96, TE97, or equivalent, measure the start lock angle at the appropriate reference blade radius.

(13) If further adjustment is necessary, repeat the previously described adjustment procedure.

(14) When the start lock angle is correctly set, check the start lock pins (160) for correct engagement of the steel ring (340) on the piston (330) as previously described.

(15) Torque the four socket head cap screws (170) against the start lock cover (150) in accordance with Table 8-1 in the Fits and Clearances chapter of this manual.

(16) Using 0.032 inch (0.81 mm) minimum diameter stainless steel wire, safety wire the four socket head cap screws to each other.

(17) Turn each set screw (120) into the start lock boss until it bottoms out against the start lock housing (140).

NOTE: This will secure the start lock housing (140) in place.

S. Beta Feedback Block Reassembly

(1) Put the carbon block unit (870) in the yoke unit (880) and align the holes in the yoke unit with the through hole in the carbon block unit.

(2) Install the clevis pin (900) through one yoke unit (880) hole, through the carbon block unit (870), and out the opposite yoke unit hole.

(3) Install the cotter pin (890) through the hole in the clevis pin (900).

(4) The external snap ring (860) will be installed at the installation of the beta feedback block assembly onto the aircraft.

(5) Refer to the Fits and Clearances chapter of this manual for the installation of the beta feedback block assembly onto the aircraft.

T. Propeller Lubrication

(1) Lubricate the propeller in accordance with the Propeller Lubrication chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

U. Static Balance

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the static balance weight drilled screws (1110).

(1) Perform static balance of the propeller in accordance with the Static and Dynamic Balance chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

V. Label Placement

(1) For information about label usage, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

4. Counterweight Slug Installation

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION INVOLVES PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS

A. For HC-E4A-3(A,I,J) Models Only

(1) General

(a) The applicable blade counterweight slugs to be installed on each propeller model are identified in the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(b) Use of corrosion protection thin film compounds.

1 The steel bolts that attach the brass counterweight slugs to the blade mounted counterweight clamps can experience severe corrosion in the grip area near the bolt head.

2 The steel bolts have the Hartzell Propeller Inc. part number A-1744 and the brass counterweight slugs have the Hartzell part numbers C-6551 and C-6551-1.

3 The corrosion is considered to be the result of a galvanic interaction between the steel bolt and the brass weight slug.

4 Maintenance practices in this manual have been changed to make every effort to make sure that a layer of cadmium plate is on the brass counterweight slug to protect the interfacing retention bolts.

5 A second source of protection that is not required, is a corrosion arresting thin film compound that may be applied to the steel bolts.

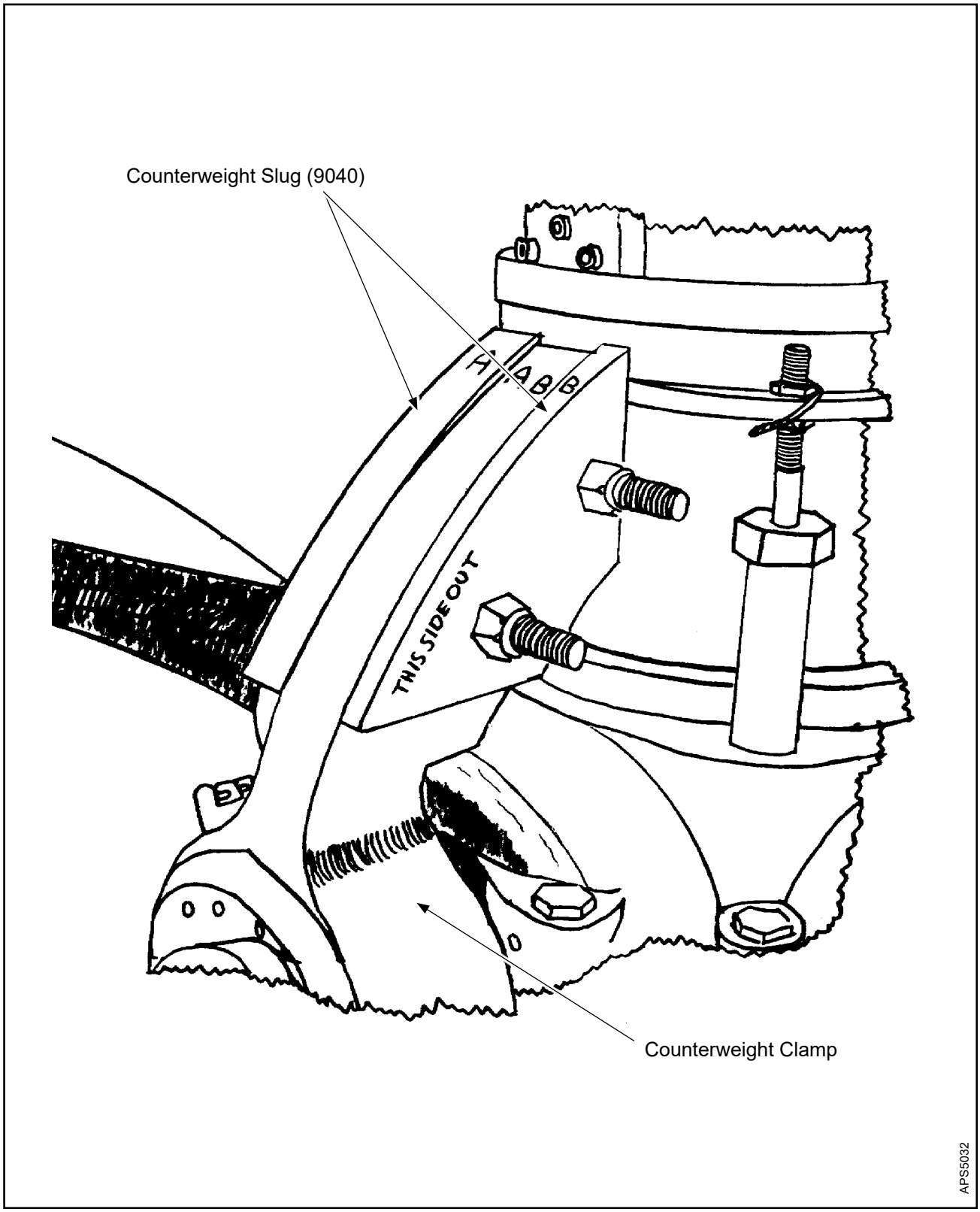
6 A thin film compound has been researched by Hartzell Propeller Inc. and is approved for optional application to the steel bolts when used for attaching brass counterweight slugs to blade mounted counterweight clamps.

7 This thin film compound is identified as ACF-50 and anti-corrosion compound CM345.

8 This compound meets Navy & Air Force specification MIL-C-81309, Amendment 3, Type II for use on aviation parts and surfaces to inhibit/stop many types of corrosion including dissimilar metal corrosion.

9 The compound eliminates moisture containing salt, dirt, and air pollutants from the surface of the metal to provide corrosion protection for slightly more than one year.

10 Although the approved thin film compound has lubricative properties, it may be applied to the entire bolt and the attaching nut if desired with no change to the specified installation torque.



Position of Counterweight Slugs
Figure 7-52

(2) Procedure
Refer to Figure 7-52.

(a) Put the counterweight slug (9040) stamped with an "A" on the side of the counterweight (9070) stamped with an "A". The words "THIS SIDE OUT" must be visible on the counterweight slug.

1 If the letters "A" and "B" are not visible on the counterweight (9070) arm when the counterweight slugs (9040) are in position, impression stamp the counterweight arm.

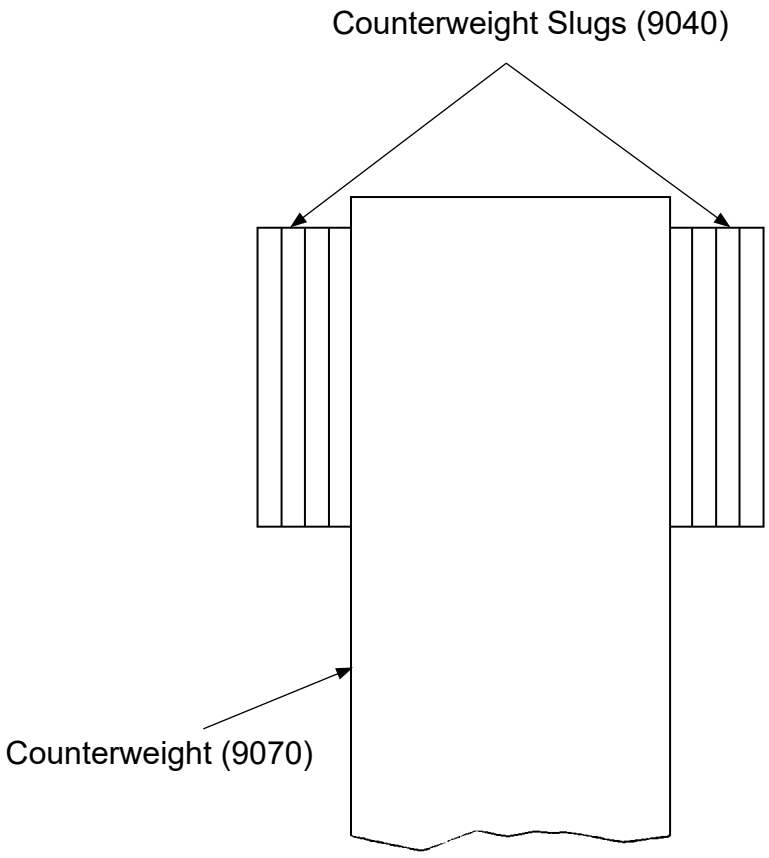
a Using a round bottom stamp, impression stamp the letters "A" and "B" on the counterweight (9070) as shown in Figure 7-52.

(b) Put the counterweight slug (9040) stamped with a "B" onto the side of the counterweight (9070) stamped with a "B". The words "THIS SIDE OUT" must be visible on the counterweight slug.

(c) Insert the attachment counterweight slug bolts (9041) through the "A" counterweight slug (9040), counterweight (9070) , and the "B" counterweight slug.

(d) Install a counterweight slug nut (9042) on each counterweight slug mounting bolt (9041).

(e) Torque each counterweight slug nut (9042) in accordance with Table 8-1, "Torque Values" in this manual.



NOTE: Counterweight slugs (9040) are application specific. For the number of counterweight slugs to be used, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

TPI-158-76

Counterweight Slugs Placement
Figure 7-53

B. For All Applicable Models Except HC-E4A-3(A,I,J)

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) For the applicable blade counterweight slugs (9040) to be installed on each propeller model, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

CAUTION: MAKE SURE THAT THE HEAD OF THE BOLT (9041) THAT ATTACHES THE COUNTERWEIGHT SLUGS (9040) TO THE COUNTERWEIGHT (9070) IS ON THE ENGINE FLANGE OR BULKHEAD-SIDE OF THE BLADE.

(2) Using new counterweight slug mounting bolts (9041), install the counterweight slugs (9040).

(a) With the head of the counterweight slug mounting bolt (9041) on the engine flange or bulkhead-side of the blade, install the applicable number of counterweight slugs (9040) on each side of the blade counterweight (9070), as shown in Figure 7-53.

1 For the number of counterweight slugs (9040) to be used, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

2 If there is an odd number of counterweight slugs (9040), put the extra counterweight slug on the spinner bulkhead-side of the counterweight (9070).

(b) Install a counterweight slug mounting nut (9042) on each counterweight slug mounting bolt (9041).

(c) Torque each counterweight slug nut (9042) in accordance with Table 8-1, "Torque Values" in this manual.

5. Propeller Disassembled for Shipping

A. General

(1) A propeller disassembled for shipping has had one or more blades removed from the propeller after assembly. The propeller was fully assembled, tested, inspected, lubricated and statically balanced before blade removal and shipping.

(2) A propeller disassembled for shipping must be assembled by trained personnel in accordance with Hartzell manuals.

(3) For additional general assembly information, refer to the General section at the beginning of this chapter.

B. Preparing Propeller for Shipping

NOTE 1: New hardware was installed during propeller assembly for shipping. When disassembling a propeller for shipping, it is not necessary to discard hardware that would require replacement at overhaul.

NOTE 2: New O-rings have been installed during propeller assembly for shipping. During propeller disassembly for shipping, it is not necessary to replace O-rings unless damaged during component installation or removal.

(1) Before removal, make a mark to indicate alignment of each blade assembly, fork unit, spinner bulkhead and balance weight location with the hub unit. Refer to the Marking before Disassembly section in the Disassembly chapter of this manual.

(2) If the propeller will be shipped without the bulkhead installed, put index labels AR-20 and AR-30 on the hub and bulkhead to show alignment of the bulkhead to the hub, before removing the bulkhead from the hub.

(3) Remove all balance weight screws (1110) and balance weights (1120).

(4) Disconnect the electric de-ice lead wires from the hub and bulkhead, if applicable.

(5) Disassemble the beta system. Refer to the Beta System Disassembly section in the Disassembly chapter of this manual.

(6) Disassemble the hydraulic system and pitch adjustment unit. Refer to the Hydraulic System and Pitch Adjustment Unit Disassembly section in the Disassembly chapter of this manual.

NOTE: It is not necessary to remove the pitch adjust sleeve unit (280) from the cylinder or the piston (330) and hex nut (310) from the pitch change rod.

(7) Propeller Reassembly with Blades Removed for Shipping

(a) When reassembling the propeller with the blades removed, do not accomplish procedures related to blade installation or setting of blade angles.

(b) Reassemble the propeller without the blade assemblies. Refer to the Assembly section in this chapter.

(8) Packing the Propeller and Blades for Shipping

(a) Refer to the Packaging and Storage chapter of Hartzell Standard Practices Manual 202A (61-01-02), for packing the propeller and blades for shipping.

(b) Pack the propeller without blades for shipping.

(c) Pack the blades for shipping with the preload plate, thrust bearing, blade seal and grease on each blade shank.

6. Reassembly of a Propeller Disassembled for Shipping

A. Unpacking the Propeller and Blades

(1) Carefully unpack the propeller and blades from shipping.

(2) Visually examine all propeller components for shipping damage. If damage is found, refer to the Check chapter of this manual for specific inspection, serviceable limits, and corrective action criteria.

B. Preparing Propeller for Reassembly

NOTE 1: New hardware was installed during propeller assembly for shipping. When disassembling a propeller from shipping, it is not be necessary to discard hardware that would require replacement at overhaul.

NOTE 2: New O-rings have been installed during propeller assembly for shipping. During propeller disassembly from shipping, it is not necessary to replace O-rings, unless they were damaged during component installation or removal.

(1) Make sure that each blade assembly, the fork unit, the spinner bulkhead, and each balance weight has been marked for alignment with the hub unit.

(2) Remove all balance weight screws (1110) and balance weights (1120).

(3) Disassemble the beta system. Refer to the Beta System Disassembly section in the Disassembly chapter of this manual.

(4) Disassemble the hydraulic system and pitch adjustment unit. Refer to the Hydraulic System and Pitch Adjustment Unit Disassembly section in the Disassembly chapter of this manual.

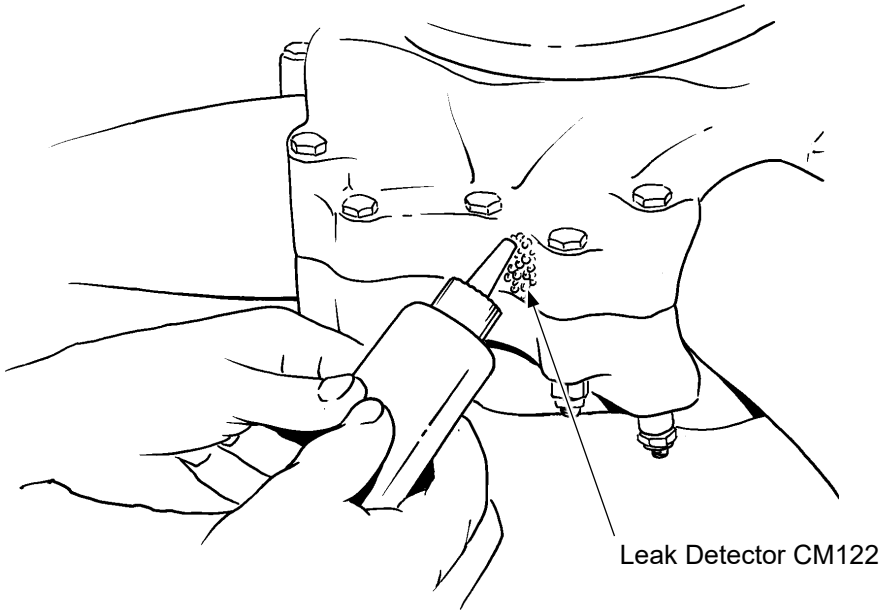
NOTE: It is not necessary to remove the pitch adjust sleeve unit (280) from the cylinder or the piston (330) and hex nut (310) from the pitch change rod.

C. Propeller Reassembly

(1) Reassemble HC-( )4A-3( ) propellers in accordance with the Assembly of HC-( )4A-3( ) Propeller Models in this chapter.

(2) Reassemble HC-( )4(N,P)-3( ) and HC-E4W-3( ) propellers in accordance with the Assembly of HC-( )4(N,P)-3( ) and HC-E4W-3( ) Propeller Models in this chapter.

(3) Reconnect the electric de-ice lead wires to the bulkhead, if applicable.



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Hub Leak Test
Figure 7-54

7. Leak Test (Rev. 3)

A. Leak Test Procedure

NOTE: Refer to the Illustration Parts List chapter of this manual for the location of the lubrication fittings and lubrication plugs (engine-side/cylinder-side) for the applicable propeller model.

(1) Install the lubrication fittings (640) in the applicable side of the hub.

(a) Tighten each lubrication fitting (640) until finger-tight, then tighten one additional 360 degree turn.

(2) Install the lubrication plugs (641) in the applicable side of the hub.

(a) Leave one lubrication plug hole open for leak testing.

(b) Tighten each lubrication plug (641) until finger-tight, then tighten one additional 360 degree turn.

(3) With the hub installed on the propeller test stand, perform the leak test in accordance with the following steps:

(a) Move the propeller to low pitch.

(b) Apply leak detector CM122 to the open lubrication plug hole. Refer to Figure 7-54.

1 If there is any indication of air exiting the hub, refer to the Testing and Fault Isolation chapter of this manual.

(4) After the leak test is complete, install the remaining lubrication plug (641) in the applicable side of the hub.

(a) Tighten the lubrication plug (641) until finger-tight, then tighten one additional 360 degree turn.

FITS AND CLEARANCES - CONTENTS

LIST OF FIGURES

LIST OF TABLES

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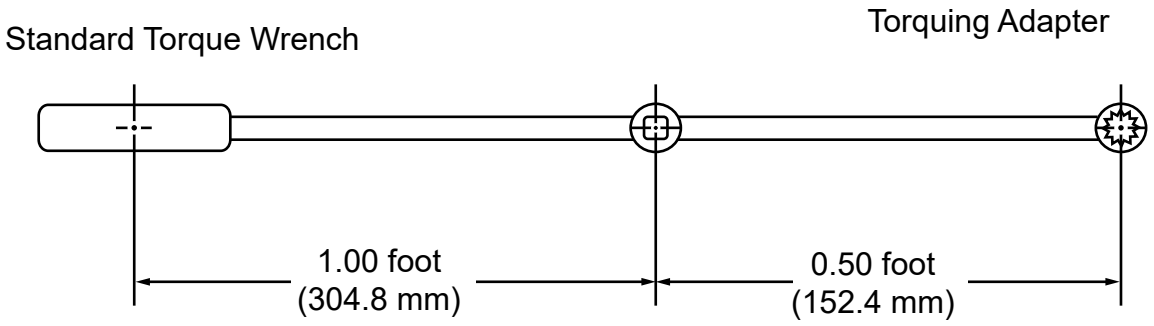

$$\frac{\text{(actual torque required) x (torque wrench length)}}{\text{(torque wrench length) + (length of adapter)}} = \text{torque wrench reading to achieve required actual torque}$$

EXAMPLE:

$$\frac{\text{100 Ft-Lb (136 N•m) x 1 ft (304.8 mm)}}{\text{1 ft (304.8 mm) + 0.50 ft (152.4 mm)}} = \text{66.7 Ft-Lb (90.4 N•m)}$$

reading on torque wrench with 6-inch (152.4 mm) adapter for actual torque of 100 Ft-Lb (136 N•m)

The correction shown is for an adapter that is aligned with the centerline of the torque wrench. If the adapter is angled 90 degrees relative to the torque wrench centerline, the torque wrench reading and actual torque applied will be equal.

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Calculating Torque When Using a Torque Wrench Adapter
Figure 8-1

1. Torque Values (Rev. 2)

A. Important Information

(1) The structural integrity of joints in the propeller that are held together with threaded fasteners is dependent upon proper torque application.

(a) Vibration can cause an incorrectly tightened fastener to fail in a matter of minutes.

(b) Correct tension in a fastener depends on a variety of known load factors and can influence fastener service life.

(c) Correct tension is achieved by application of measured torque.

(2) Use accurate wrenches and professional procedures to make sure of correct tensioning.

(3) For the torque values to use when assembling a Hartzell Propeller Inc. propeller, refer to Table 8-1, "Torque Values" in this chapter.

(4) When an adapter is used with a torque wrench, use the equation in Figure 8-1 to determine the correct torque value.

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CAUTION 1: TORQUE VALUES ARE BASED ON NON-LUBRICATED THREADS, UNLESS SPECIFIED IN TABLE 8-1.

CAUTION 2: FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER, REFER TO FIGURE 8-1.

NOTE: Torque tolerance is ± 10 percent unless otherwise noted. Wet torque denotes use of anti-seize compound CM118.

Item No.	Part Number	Nomenclature / Location	Torque		
			Ft-Lb	In-Lb	N•m
10	B-3839-5	Nut, Hex, Thin, Drilled / Beta Ring	- -	120	13.5
40	B-3839-16	Nut, Hex, Thin, Drilled / Cylinder	120	1440	163
60	B-3375	Nut, Hex, Thin, Drilled / Cylinder	165	1980	224
90	D-484	Cylinder	200 wet	2400 wet	271 wet
	D-488	Cylinder	200 wet	2400 wet	271 wet
	D-1657	Cylinder	200 wet	2400 wet	271 wet
	D-6827	Cylinder	200 wet	2400 wet	271 wet
100	B-3841-5	Screw, 1/4-28, Fillister Head / Cylinder	- -	41	4.6
170	B-3821	Screw, 10-32, Cap / Start Lock Housing Cover	- -	72	8.1
220	B-3829	Screw, 10-32 / Yoke Tappet	- -	43-53	4.9-5.9
240	A-2038-12	Screw, 1/4-28, Cap / Cylinder Clamp	- -	60-80	6.8-9
310	B-474	Nut, 1 1/8-12, Hex, Self-locking / Piston	100	1200	136
400	B-3808-3	Nut, Hex, Self-Locking / Pitch Change Rod	- -	43-53	4.9-5.9
430	D-494-( )	Rod, Pitch Change	80 wet	960 wet	109 wet
	D-6071-( )	Rod, Pitch Change	80 wet	960 wet	109 wet
	D-6506	Rod, Pitch Change	80 wet	960 wet	109 wet
	103872	Rod, Pitch Change	80 wet	960 wet	109 wet
600	A-2043-1	Nut, 3/8-24, Hex Self-locking / Hub, Clamping	22	264	30
620	B-3808-3	Nut, Hex, Self-locking / Hub, Lightning	- -	43-53	4.9-5.9
690	B-468	Extension, Bumper / Pitch Change Fork	- -	72-96	8.2-10.8
720	B-3824	Screw, 8-32, 100° Head	- -	48-60	5.5-6.7
	B-6521-8	Screw, 10-32, 100° Head	- -	72-84	8.2-9.4
820	B-3368	Nut, 5/16-24, Hex, Thin / Beta Ring	- -	120	13.5
	B-3839-5	Nut, Hex, Thin, Drilled / Beta Ring	- -	120	13.5

-ITEM NOT ILLUSTRATED

Torque Values
Table 8-1, page 1 of 2

CAUTION 1: TORQUE VALUES ARE BASED ON NON-LUBRICATED THREADS, UNLESS SPECIFIED IN TABLE 8-1.

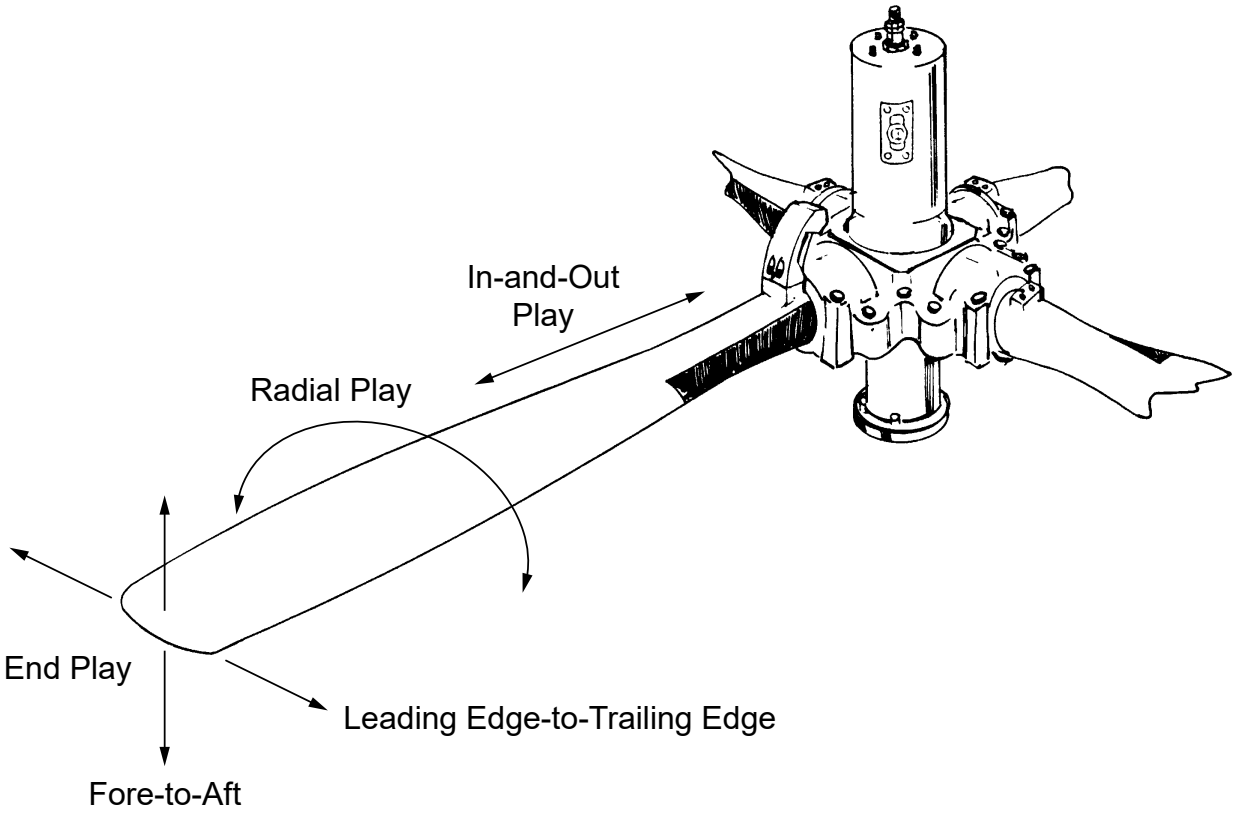
CAUTION 2: FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER, REFER TO FIGURE 8-1.

NOTE: Torque tolerance is ±10 percent unless otherwise noted. Wet torque denotes use of anti-seize compound CM118.

Item No.	Part Number	Nomenclature / Location	Torque		
			Ft-Lb	In-Lb	N•m
920	B-3385-3H	Bolt, 5/16-24, Hex head / Pitch Change Knob Bracket	16-18	192-216	22-24
	B-3830	Bolt, 5/16-24, 12 Point / Pitch Change Knob Bracket	18-22	216-264	25-29
	108142	Bolt, 1/4-28, 12 Point / Pitch Change Knob Bracket	16-18	192-216	22-24
973	B-3867-272	Screw, 10-32, 100°, Head, Cres	- -	8-10	0.9 - 1.1
1020	B-3368	Nut, 5/16-24, Hex, Thin / Preload Plate	- -	120	13.5
-	B-3384-( )	Bolt, 1/4-28, Hex Head / Bulkhead	- -	96-120	10.9-13.5
-	A-2070-( )	Screw, 1/4-28, Button Head / Bulkhead	- -	96-120	10.9-13.5
1195	B-3868-S52	Screw, 8-32, 100 Deg Head	Tighten until snug.		
9042	A-2043-1	Nut, 3/8-24, Hex Self-locking / Counterweight Slug Mounting	22	264	30
	B-3599	Nut, 3/8-24, Hex Self-locking / Counterweight Slug Mounting	22	264	30

-ITEM NOT ILLUSTRATED

Torque Values
Table 8-1, page 2 of 2



Blade Play
Figure 8-2

2. Blade Tolerances (Rev. 5)

A. Blade Play

(1) Limits for aluminum blade play are specified below. Refer to Figure 8-2.

(a) End Play:		
1	Leading Edge to Trailing Edge	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)
2	Fore-and-Aft (face to camber)	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)
(b)	In-and-Out Play	None permitted
(c)	Radial Play (pitch change)	±0.5 degree (1 degree total) measured at reference station

(2) Limits for composite blade play are specified below. Refer to Figure 8-2.

(a) End Play - **except** HC-E4A-3(A,I,J):		
1	Leading Edge to Trailing Edge	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)
2	Fore-and-Aft (face to camber)	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)
(b) End Play - HC-E4A-3(A,I,J) **only**:		
1	Leading Edge to Trailing Edge	± 0.375 inch (9.52 mm) Total: 0.750 inch (19.05 mm)
2	Fore-and-Aft (face to camber)	± 0.375 inch (9.52 mm) Total: 0.750 inch (19.05 mm)
(c)	In-and-Out Play	None permitted
(d)	Radial Play (pitch change)	±0.5 degree (1 degree total) measured at reference station

(3) Blades should be tight in the propeller; however, play that is within the allowable limits is acceptable if the blade returns to its original position when released.

(a) If blade play is greater than the allowable limits, or if the blade(s) do not return to their original position when released, there may be internal wear or damage that should be referred to a certified propeller repair station with the appropriate rating.

B. Blade Track

(1)	Aluminum Blades	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)
(2)	Composite Blades:	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)

C. Blade Pitch Tolerance

(1)	Blade pitch setting tolerance between blades at low pitch	0.2 degree

3. Clearance Between the Carbon Block Unit and the Beta Ring

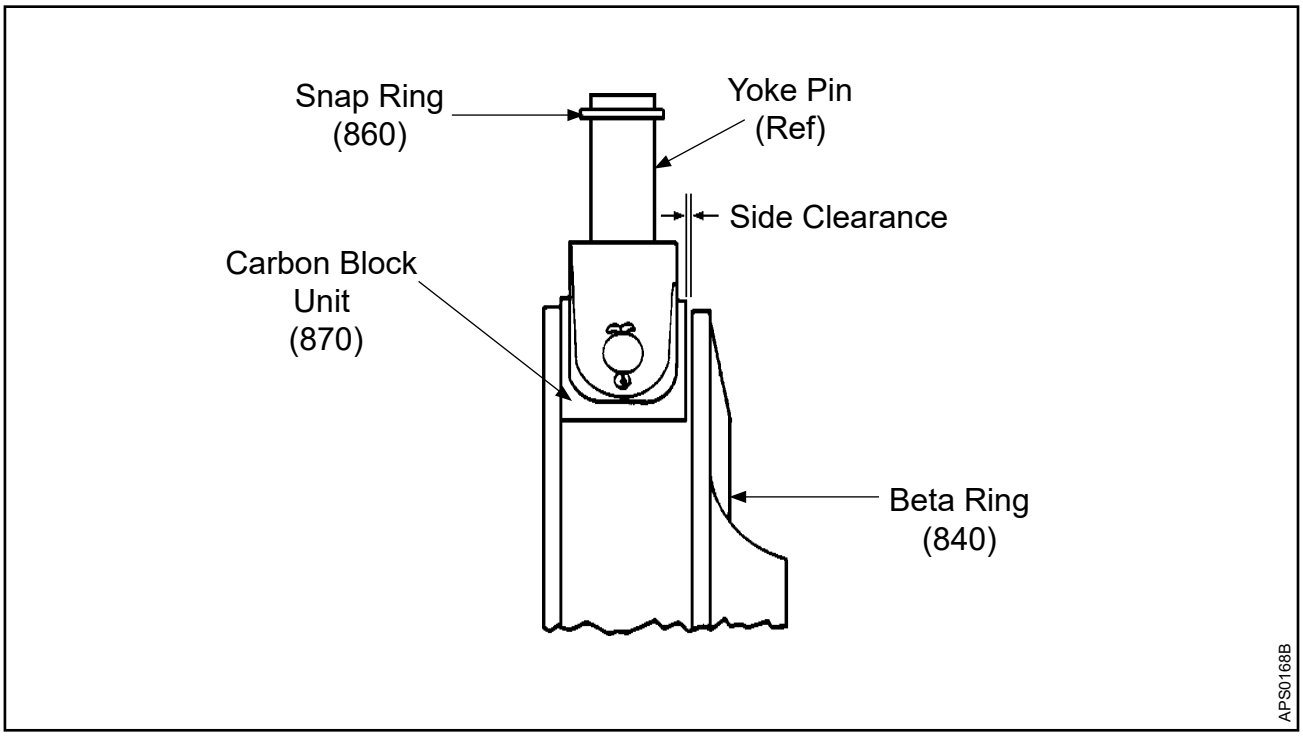
   A. The carbon block unit (870) must be replaced at overhaul.

   B. Check the following clearance dimension upon installation of the carbon block assembly in the beta ring, and whenever unusual conditions exist that could create excessive wear. Refer to Figure 8-3.

      (1) The minimum permitted side clearance between a new carbon block unit (870) and the beta ring (840) when installed is 0.001 inch (0.03 mm).

      (2) The maximum permitted side clearance between the carbon block unit and the beta ring (840) is 0.010 inch (0.25 mm).

      (3) If the side clearance between the carbon block unit and the beta ring (840) is not within the permitted limits, replace the carbon block unit (870).



Carbon Block and Beta Ring Clearance
Figure 8-3

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT - CONTENTS

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1. Tooling and Facility Requirements (Rev. 1)

   A. Standard Tooling

      (1) Propeller repair stations certified by the FAA or international equivalent to overhaul Hartzell Propeller Inc. propellers are expected to possess precision fixtures, tools, and blade tables for blade inspection and repair.

         (a) Except as specifically required in this manual, locally fabricated tooling is acceptable for most repair and inspection operations.

   B. Special Tooling

      (1) Special tooling may be required for procedures in this manual. For further tooling information, refer to Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165A (61-00-65).

         (a) Tooling reference numbers appear with the prefix “TE” directly following the tool name to which they apply. For example, a template that is reference number 133 will appear as: template TE133.

         (b) It is the responsibility of the repair station or the technician performing the repair or servicing to use these special tools as required.

   C. Facilities

      (1) Grinding, plating, and painting of propeller components can create health and safety hazards beyond that of other areas of a typical workshop.

         (a) Areas where grinding, plating, and painting are performed should comply with governmental regulations for occupational safety and health, industry standards, and environmental regulations.

      (2) Workshop areas need to be segregated to prevent contamination.

         (a) Separate areas should be designated for cleaning, inspection, painting, plating, and assembly.

         (b) Propeller balancing must be performed in a draft free area.

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ILLUSTRATED PARTS LIST - CONTENTS

PROPELLER PARTS LISTS and FIGURES

PROPELLER PARTS LISTS and FIGURES, CONTINUED

PROPELLER PARTS LISTS and FIGURES, CONTINUED

SUB-ASSEMBLY PARTS LISTS and FIGURES

SUB-ASSEMBLY PARTS LISTS and FIGURES, CONTINUED

1. Introduction (Rev. 1)

WARNING: ANY PART IDENTIFIED AS AN EXPERIMENTAL OR NON-AVIATION PART MUST NOT BE USED IN AN FAA OR INTERNATIONAL EQUIVALENT TYPE CERTIFICATED PROPELLER. A PART IDENTIFIED AS EXPERIMENTAL OR NON-AVIATION DOES NOT HAVE FAA OR INTERNATIONAL EQUIVALENT APPROVAL EVEN THOUGH IT MAY STILL SHOW AN AVIATION TC OR PC NUMBER STAMP. USE ONLY THE APPROVED ILLUSTRATED PARTS LIST PROVIDED IN THE APPLICABLE OVERHAUL MANUAL OR ADDITIONAL PARTS APPROVED BY AN FAA ACCEPTED DOCUMENT FOR ASSEMBLY OF A PROPELLER. THE OPERATOR ASSUMES ALL RISK ASSOCIATED WITH THE USE OF EXPERIMENTAL PARTS. USE OF EXPERIMENTAL PARTS ON AN AIRCRAFT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

A. General

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) This chapter includes the parts lists and applicable illustrations for the propeller models included in this manual.

CAUTION: THE ILLUSTRATIONS IN THIS CHAPTER ARE PROVIDED FOR PART IDENTIFICATION AND LOCATION REFERENCE ONLY. THEY SHOULD NOT BE USED FOR ASSEMBLY.

(a) The illustrations in this chapter use some general views of parts that may not exactly depict every propeller part configuration.

B. Counterweights/Slugs/Mounting Hardware

(1) Counterweights, counterweight slugs, and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

C. Spinner Assemblies/Mounting Hardware

(1) Spinner assemblies and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

D. Ice Protection System Components

(1) Ice protection systems are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(a) For components of ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(b) For components of ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

2. Description of Columns (Rev. 1)

A. Fig./Item Number

(1) Figure Number refers to the illustration where items appear.
Item Numbers refer to the specific part callout in the applicable illustration.

(a) Item Numbers that are listed but not shown in the illustration are identified by a dash to the left of the item number. (example: "-800")

(b) Alpha variants will be used to add additional items. There are two reasons for the use of alpha variants:

1 A part may have an alternate, or may be superseded, replaced, or obsoleted by another part.

a For example, the self-locking nut (A-2043) that is item 20 was superseded by the self-locking nut (A-2043-1) that is item 20A.

2 An Illustrated Parts List may contain multiple configurations. Effectivity codes are used to distinguish different part numbers within the same list.

a For example, one propeller configuration may use a mounting bolt (B-3339-1) that is item 30, yet another propeller configuration uses a mounting bolt (B-3347) that is item 30A. Effectivity codes are very important in the determination of parts in a given configuration.

B. Part Number

(1) The Part Number is the Hartzell Propeller Inc. identification number for the part.

(2) Use the Hartzell Propeller Inc. part number when ordering the part from Hartzell or a Hartzell-approved distributor.

C. Description

(1) This column provides the Hartzell Propeller Inc. description of the part.

(2) Bullets and indentations are used to indicate parts that are components of a sub-assembly.

(a) For example, a Fork Assembly that is part of a HC-C2YR-1 propeller assembly will have one bullet (•) before the description. This indicates that the Fork Assembly is part of the propeller assembly.

1 A Fork Bumper that is part of the Fork Assembly will appear directly below the Fork Assembly with two bullets (• •) before the description. This indicates that the Fork Bumper is part of the Fork Assembly - that is part of the Propeller Assembly.

a Example: HC-C2YR-1
• Fork Assembly
• • Fork Bumper

(3) If the description in this column includes a “PCP:” prefix, the part is classified as a Propeller Critical Part.

(4) If applicable, information regarding part alternatives, supersedures, replacements, or obsolescence will appear in the Description column.

(a) Refer to the section, “Description of Terms” in this chapter for definitions and requirements for part “alternates”, “supersedures”, etc.

(b) When part alternatives, supersedures, replacements, etc. are listed, the service document number related to the change may be included for reference.

(5) If applicable, vendor CAGE codes will be listed in the Description column.

D. Effectivity Code (EFF CODE)

(1) This column is used when additional information about a part is required.

(a) Effectivity codes can be used to identify parts that are only used on a particular model, or to direct the user to additional information in the “Effectivity” box at the bottom of the page.

(b) Whenever an effectivity code is present, refer to the “Effectivity” box at the bottom of the page for the applicable information.

(2) Parts common to all assembly models on the page show no effectivity code.

E. Units Per Assembly (UPA)

(1) Designates the total quantity of an item required for the next higher assembly or subassembly.

F. Overhaul (O/H)

(1) Designates the parts to be replaced at overhaul. A “Y” identifies the parts that must be replaced at overhaul.

NOTE: An overhaul kit may not contain all the parts identified with a “Y” for a particular model propeller. An example of parts that may not be included in the overhaul kit is spinner mounting parts.

G. Propeller Critical Part (PCP)

(1) This column identifies the Propeller Critical Parts (PCP) that are contained in each propeller model.

(a) Refer to the Introduction chapter of this manual for the definition of Propeller Critical Parts (PCP).

3. Description of Terms (Rev. 1)

A. Alternate

(1) Alternate parts are identified by the term “ALTERNATE” in the Description column. Alternate items are considered airworthy for continued flight and existing stock of parts may be used for maintenance and/or repair. The new or alternate part number may be used interchangeably when ordering/stocking new parts.

B. Supersedure

(1) Part changes are identified by the terms “SUPERSEDES ITEM _____” or “SUPERSEDED BY ITEM _____” in the Description column. Superseded items are considered airworthy for continued flight and existing stock of superseded parts may be used for maintenance and/or repair. Once the superseding part has been incorporated/installed into an assembly, the original superseded part may no longer be used. Superseded parts may no longer be available, and the new part number must be used when ordering/stocking new parts.

C. Replacement

(1) Part changes identified by the terms “REPLACES ITEM _____” or “REPLACED BY ITEM _____” in the Description column are considered airworthy for continued flight, but must be replaced with a part with the new part number at overhaul. Existing stock of replaced parts may not be used for maintenance and/or repair of effected assemblies. Replaced parts may no longer be available, and the new part number must be used when ordering/stocking new parts.

D. Obsolete

(1) Obsolete parts are identified by “OBS” in the Units Per Assembly (UPA) column. Obsolete items are considered unairworthy for continued flight.

4. Vendor Supplied Hardware (Rev. 1)

A. Important Information

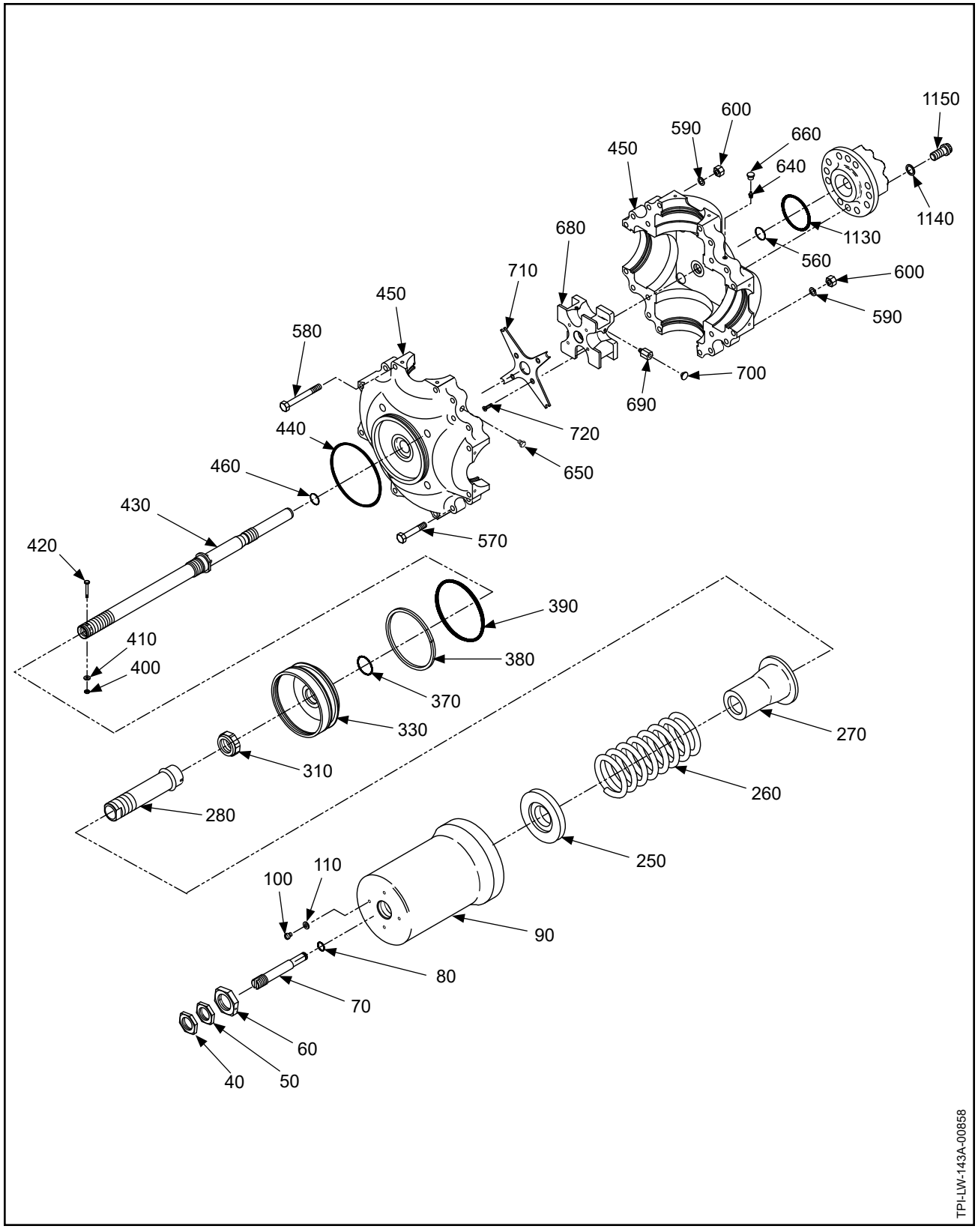
(1) Many O-rings, fasteners, and other vendor supplied hardware listed in Hartzell Propeller Inc. manuals have previously been specified with AN, MS, NAS, or vendor part number. To provide internal controls and procurement flexibility, Hartzell part numbers have been assigned to all O-rings, fasteners, and hardware. Part shipments from Hartzell Propeller Inc. will specify only the Hartzell part numbers.

(2) Some O-rings, fasteners, and hardware manufactured in accordance with established industry specifications (certain AN, MS, NAS items) are acceptable for use in Hartzell Propeller Inc. products without additional standards imposed by Hartzell.

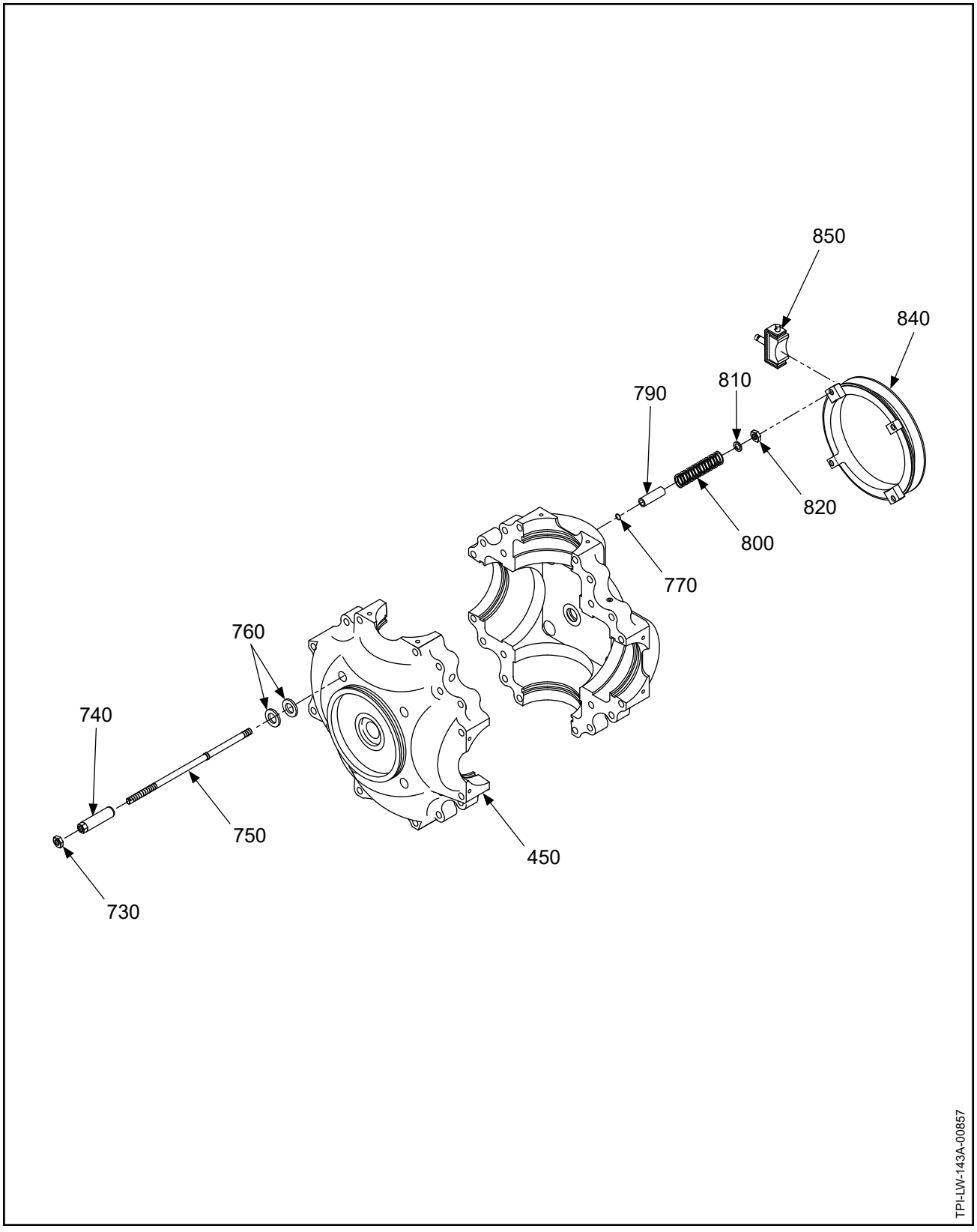
(a) For a listing of part number interchangeability, refer to the Vendor Cross Reference chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Where permitted, both the Hartzell part number item and AN, MS, NAS, and other specified vendor number items can be used interchangeably.

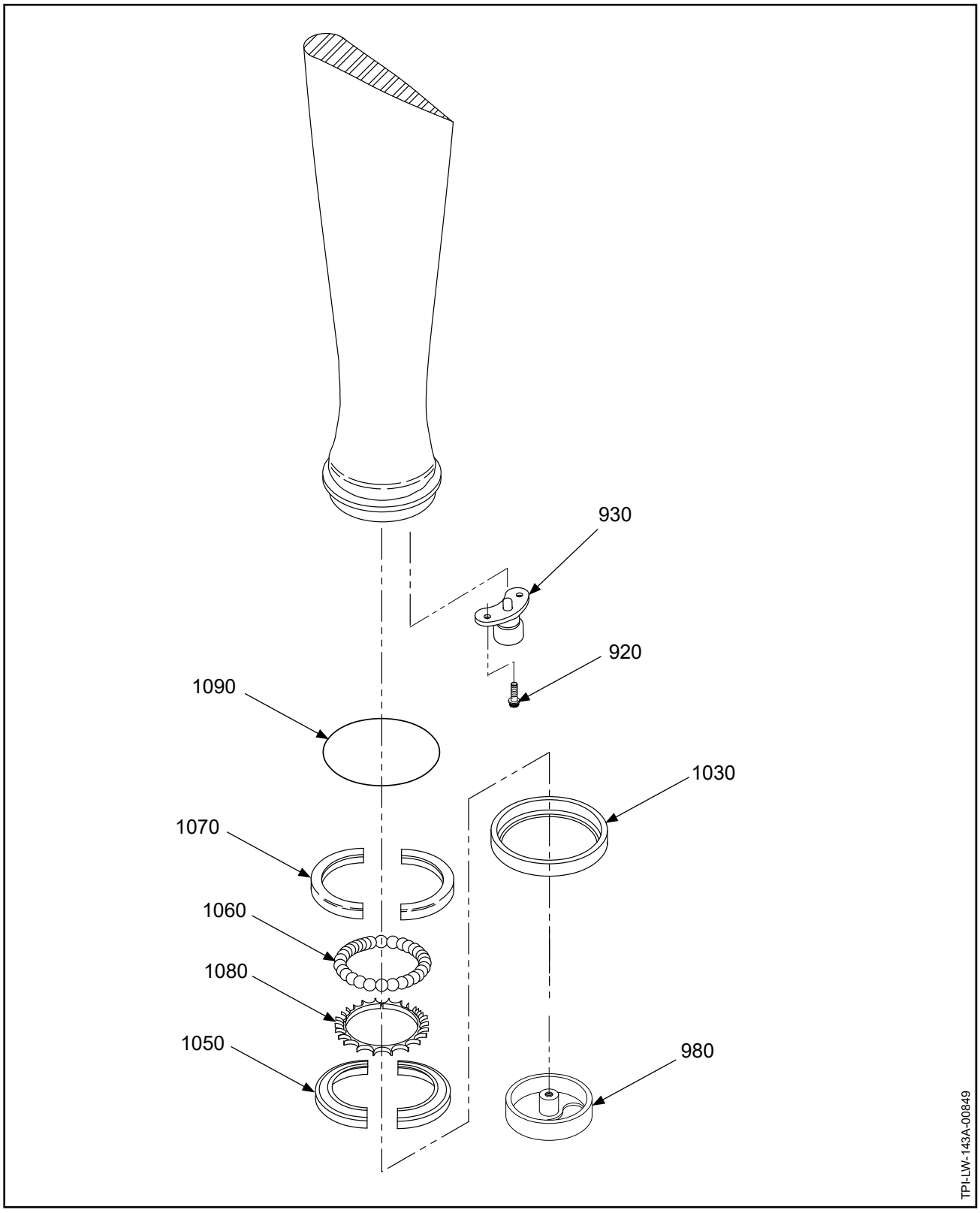
(c) The Hartzell part number must be used when ordering these parts from Hartzell Propeller Inc.



HC-D4N-3A, -3C, -3E, -3G: Propeller Parts
Figure 10-1



HC-D4N-3A, -3C, -3E, -3G: Beta System Parts
Figure 10-2



HC-D4N-3A, -3C, -3E, -3G: Blade Retention Parts
Figure 10-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FORWARD, ONLY USED WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED**				
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-499	• PCP: HUB, SUPERSEDED BY ITEM 450B (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-499-1	• PCP: HUB, ALTERNATE SUPERSEDED BY ITEM 450C (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450B	D-499-2	• PCP:HUB UNIT, D4N-3, SUPERSEDES ITEM 450 (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450C	D-499-3	• PCP:HUB UNIT, HC-D4(N,P)-3, ALTERNATE SUPERSEDES ITEM 450A (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED**				
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY, SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD, USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720A	B-6521-8	• • SCREW, 10-32, 100° HEAD, USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED				
10-2		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING (RETAINER)		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BETA FEEDBACK BLOCK ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED				
10-3		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY, REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-431	• • PRELOAD PLATE, INCLUDED IN ITEM 980		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING, POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030, USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3, USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED				
10-3		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090A, SUPERSEDED BY ITEM 1090B		1	Y	
1090A	C-3317-340-3	• O-RING (BLADE MOUNTING), ALTERNATE FOR ITEM 1090 SUPERSEDED BY ITEM 1090		1	Y	
1090B	C-3317-340-8	• O-RING (BLADE MOUNTING), SUPERSEDES ITEM 1090 POST HC-SL-61-301	E	1	Y	

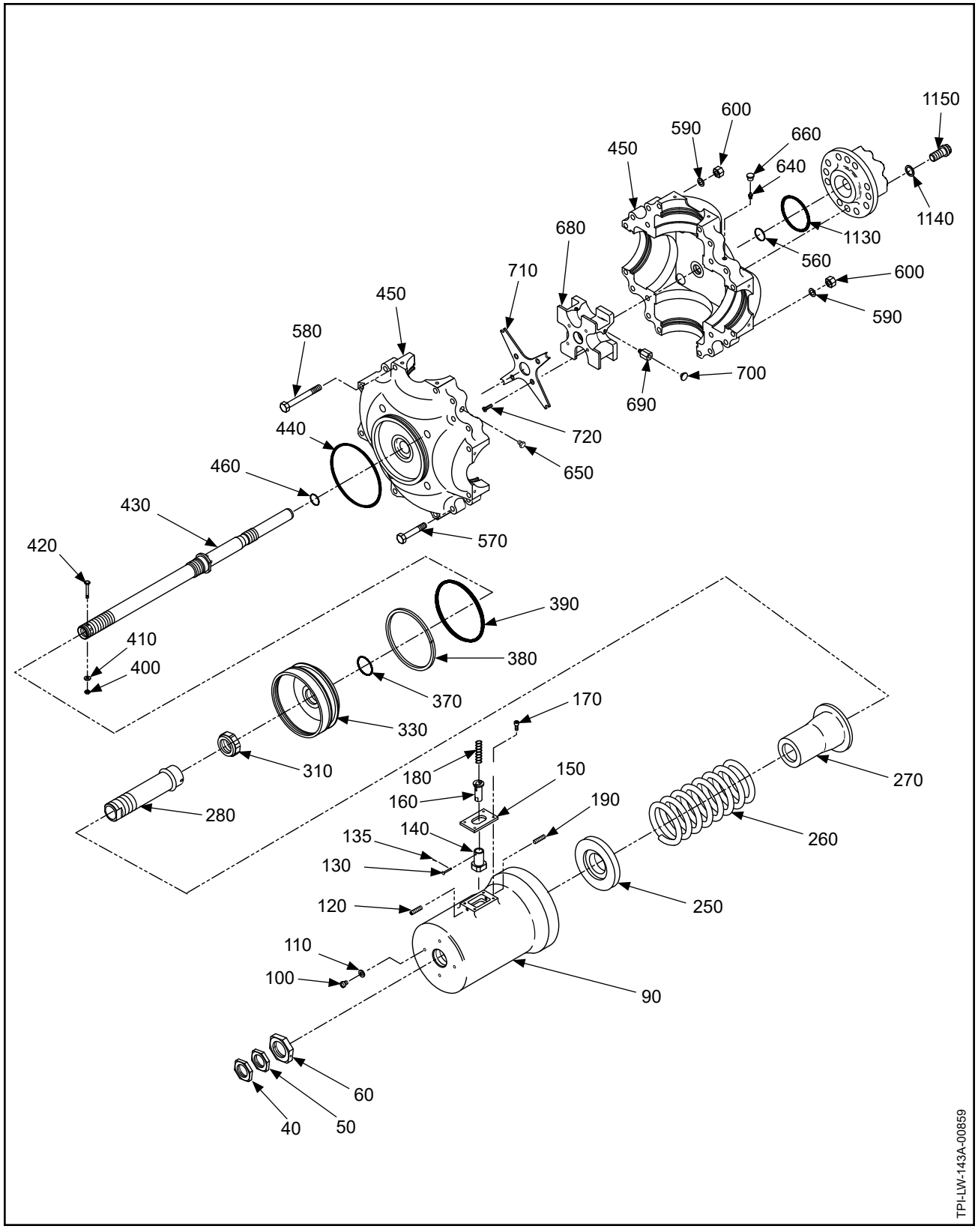
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

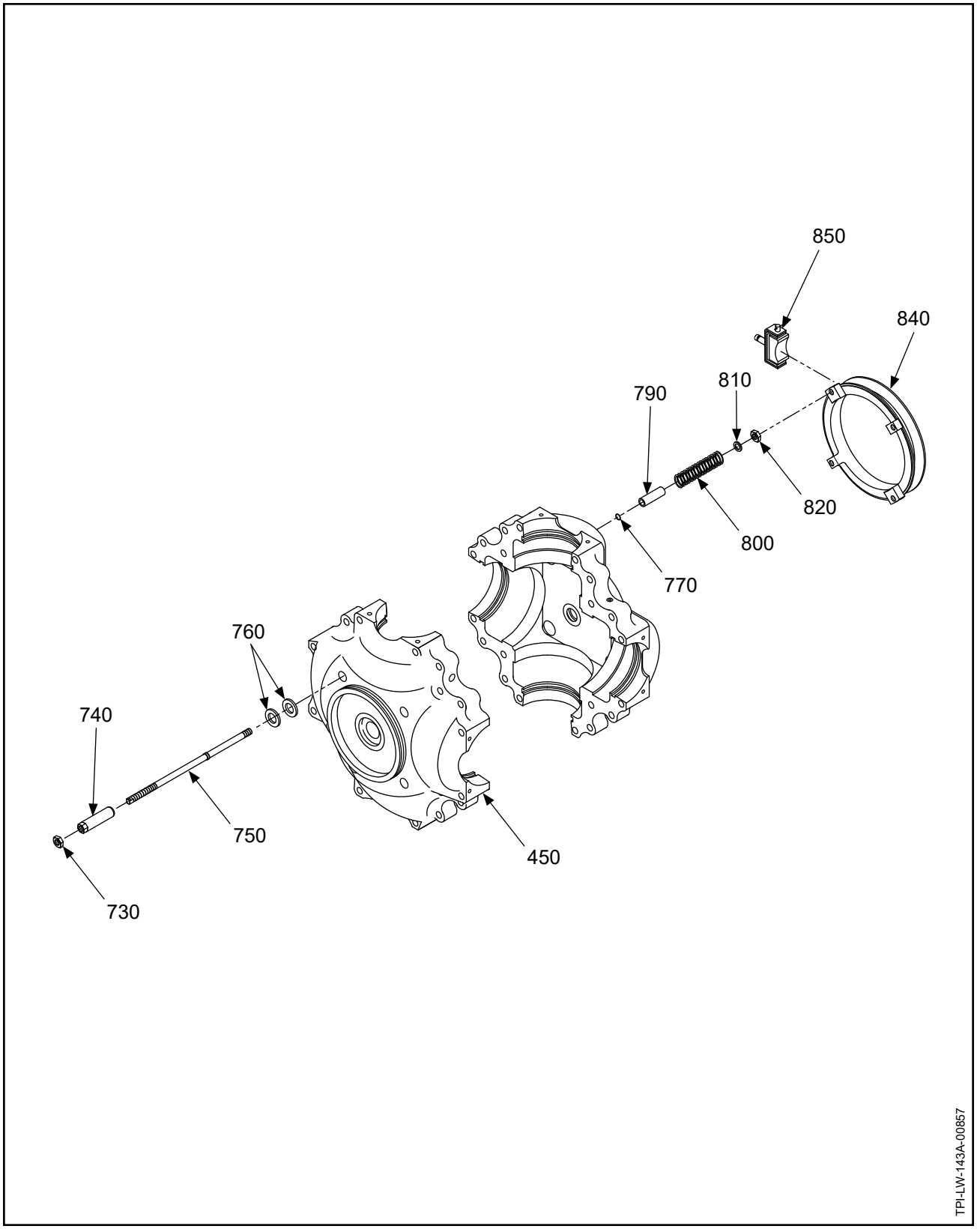
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-D4N-3A, -3C, -3E, -3G, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

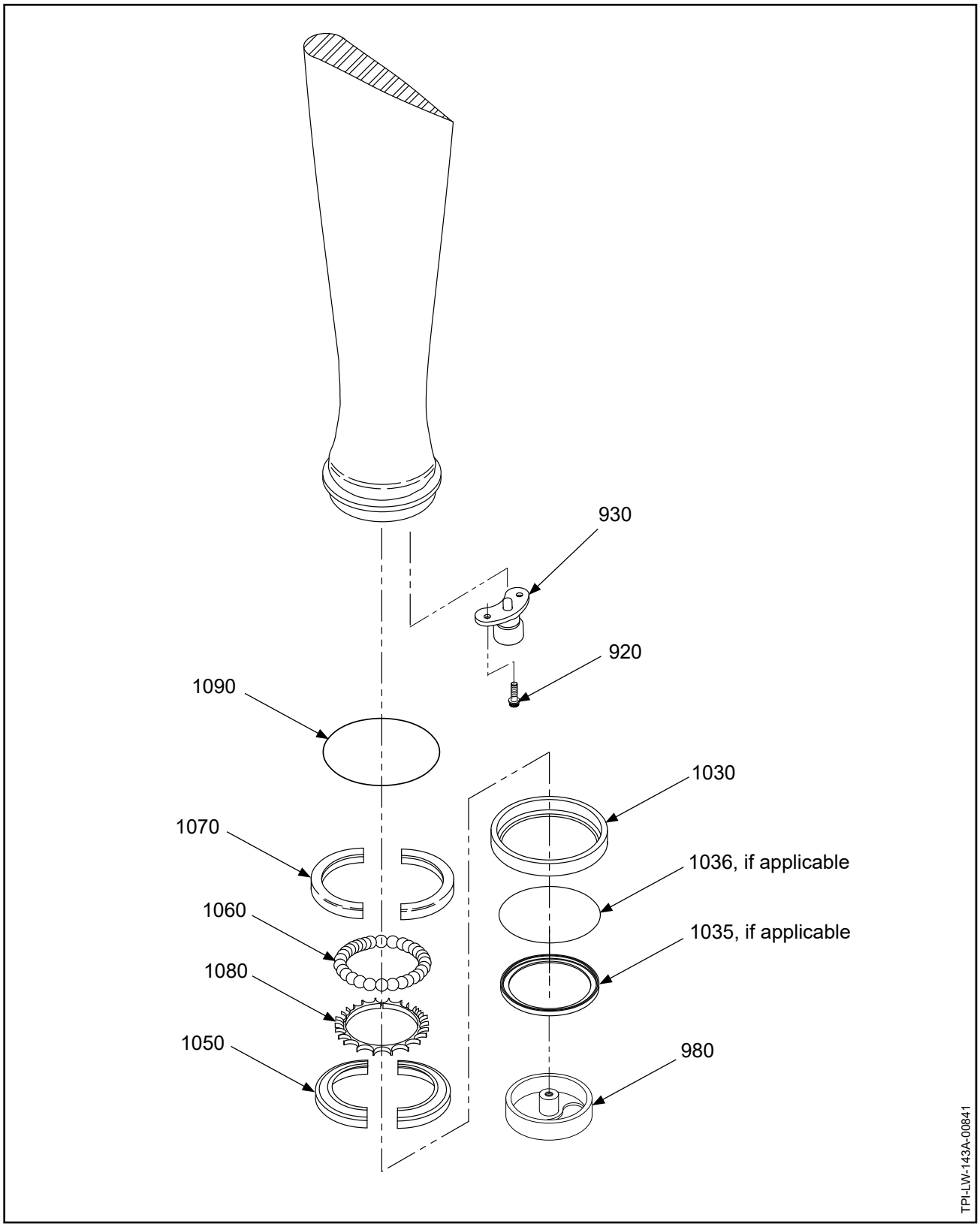
- ITEM NOT ILLUSTRATED



HC-D4N-3AY: Propeller Parts
Figure 10-4



HC-D4N-3AY: Beta System Parts
Figure 10-5



HC-D4N-3AY: Blade Retention Parts
Figure 10-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER ASSEMBLY PARTS - HC-D4N-3AY**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-484	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
120	B-6639-131	• SCREW, SET		4	Y	
130	B-2877	• CLEVIS PIN, 3/32		2	Y	
135	B-3838-1	• COTTER PIN		2	Y	
140	B-444-4	• HOUSING, START LOCK		2		
150	B-446	• COVER, HOUSING, START LOCK		2		
160	A-2620-1	• PIN, START LOCK		2		
170	B-3821	• SCREW, 10-32, CAP		8	Y	
180	B-658	• SPRING, COMPRESSION		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST-UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
320	C-497	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
340	B-493	• • RING, PISTON, START LOCK		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-499-3	• PCP: HUB UNIT, HC-D4(N,P)-3 (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-D4N-3AY, CONTINUED**				
560	C-3317-211-2	• O-RING, ENGINE-SIDE BUSHING ID		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		4		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3AY, CONTINUED				
10-5		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• RING, BETA		1		
850	A-3044	• BETA FEEDBACK BLOCK ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3AY, CONTINUED				
10-6		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEM 930		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930A		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930A (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	101004	• PRELOAD PLATE ASSEMBLY (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	102158	• RING, RETAINING, BEARING		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030		1	Y	
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	

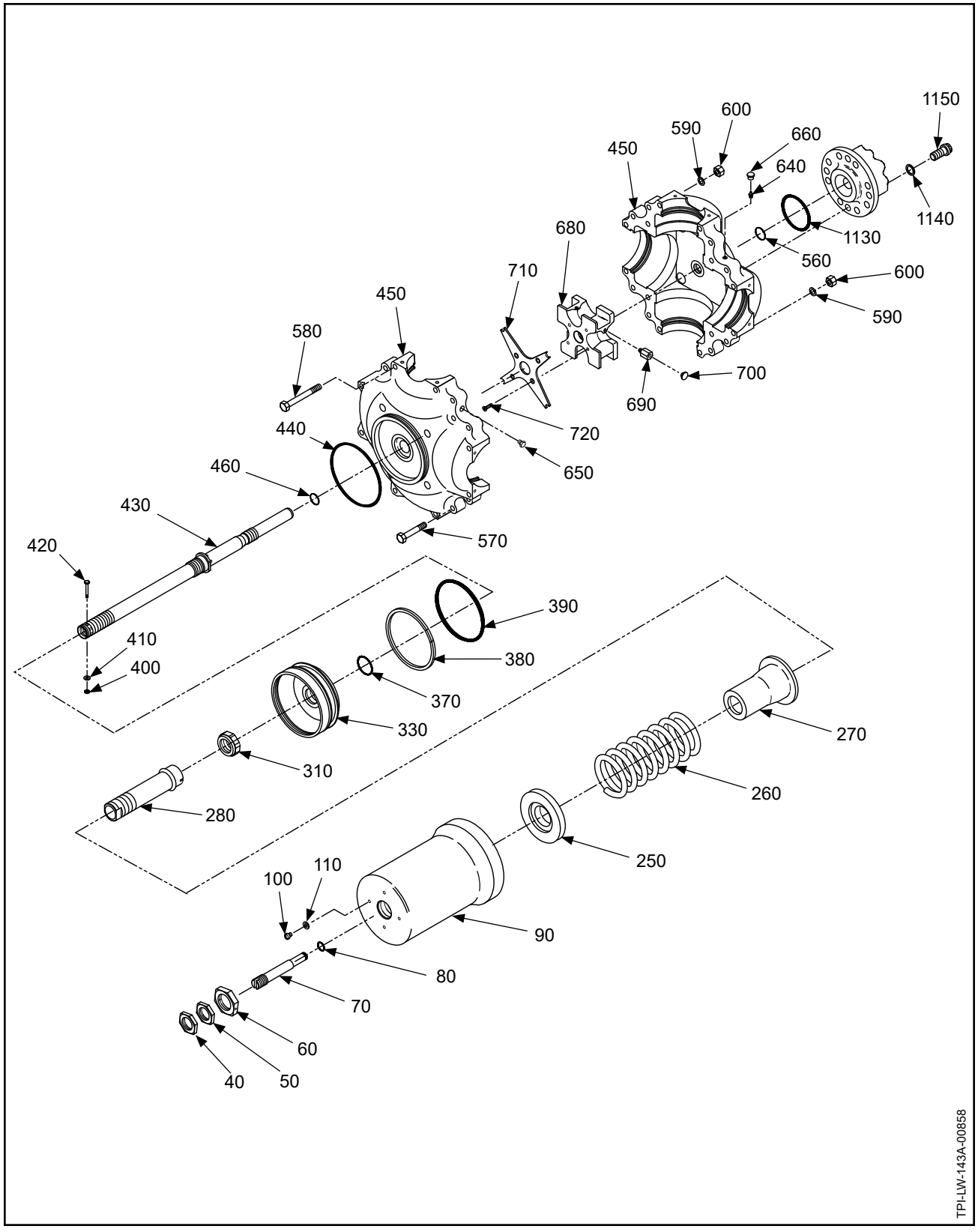
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

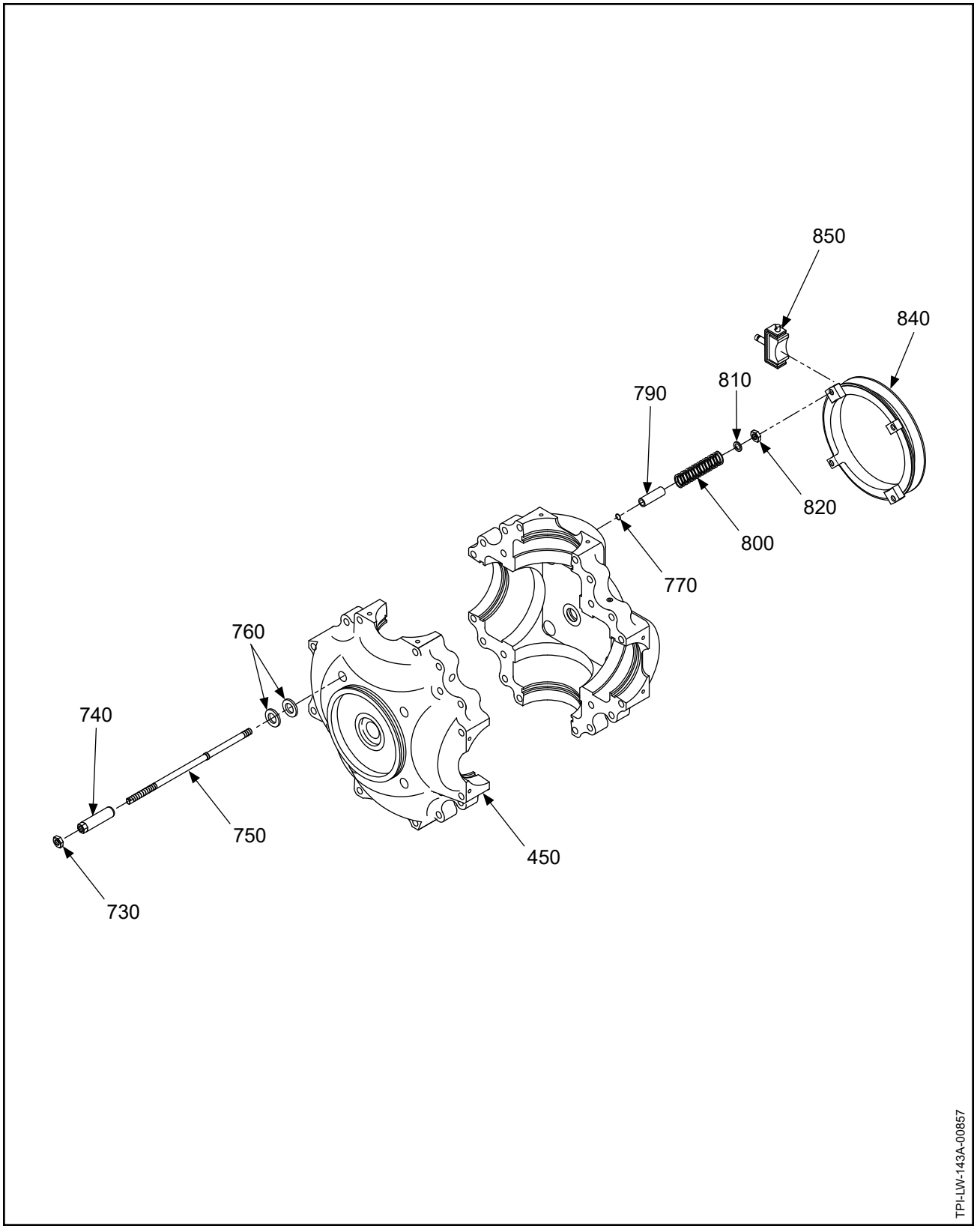
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-D4N-3AY, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

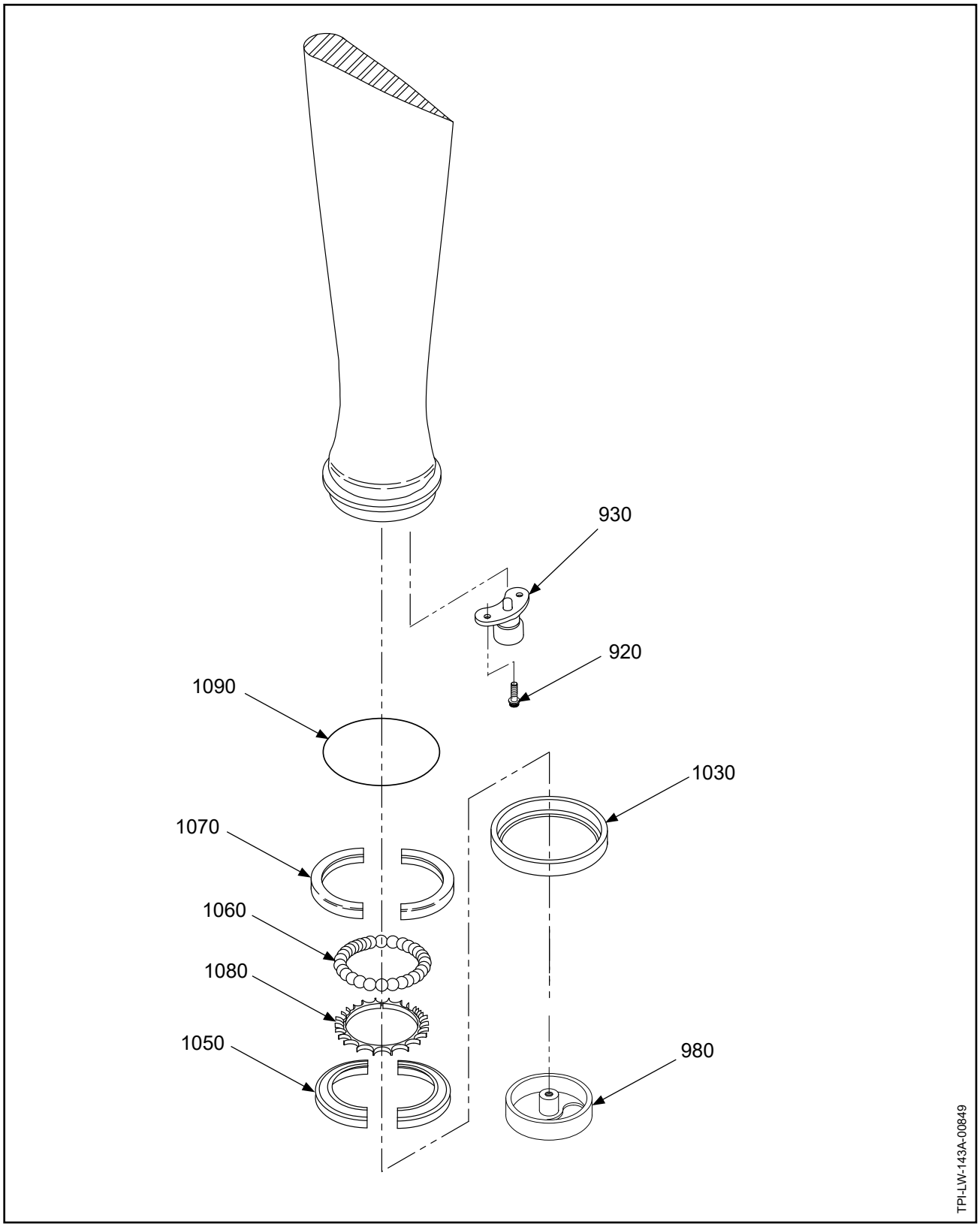
- ITEM NOT ILLUSTRATED



HC-D4N-3N: Propeller Parts
Figure 10-7



HC-D4N-3N: Beta System Parts
Figure 10-8



HC-D4N-3N: Blade Retention Parts
Figure 10-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-D4N-3N**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD				
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430B		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430B		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430B		1	Y	
430	D-6071-1	• PCP: ROD, PITCH CHANGE SUPERSEDED BY ITEM 430B		1		PCP
430A	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE FOR ITEM 430		1		PCP
430B	D-6506	• PCP:ROD, PITCH CHANGE, SUPERSEDES ITEM 430 AND ITEM 430A, POST HC-SL-61-240		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-D4N-3N, CONTINUED**				
450	D-499-2	• PCP: HUB UNIT, D4N-3 (REFER TO "D-499-( ) HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-499-3	• PCP: HUB UNIT, HC-D4(N,P)-3, ALTERNATE (REFER TO "D-499-( ) HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING, ENGINE-SIDE BUSHING ID		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD USE ONLY WITH ITEM 670		4	Y	
-670A	C-633	• FORK, FOUR BLADE - ASSEMBLY, ALTERNATE FOR ITEM 670		1		
680A	D-495	• • FORK, FOUR BLADE		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670A		4		
720A	B-3824	• • SCREW, 8-32, 100° HEAD USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3N, CONTINUED				
10-8		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4		
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BETA FEEDBACK BLOCK ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3N, CONTINUED				
10-9		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO "100028-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO "B-464-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO "108303-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY REPLACED BY ITEM 980A (REFER TO "C-459 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-431	• • PRELOAD PLATE, INCLUDED IN ITEM 980		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO "101004 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING POST HC-SL-61-241, R3, SUPERSEDES ITEM 1030 USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3N, CONTINUED				
10-9		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
1080	B-3211	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

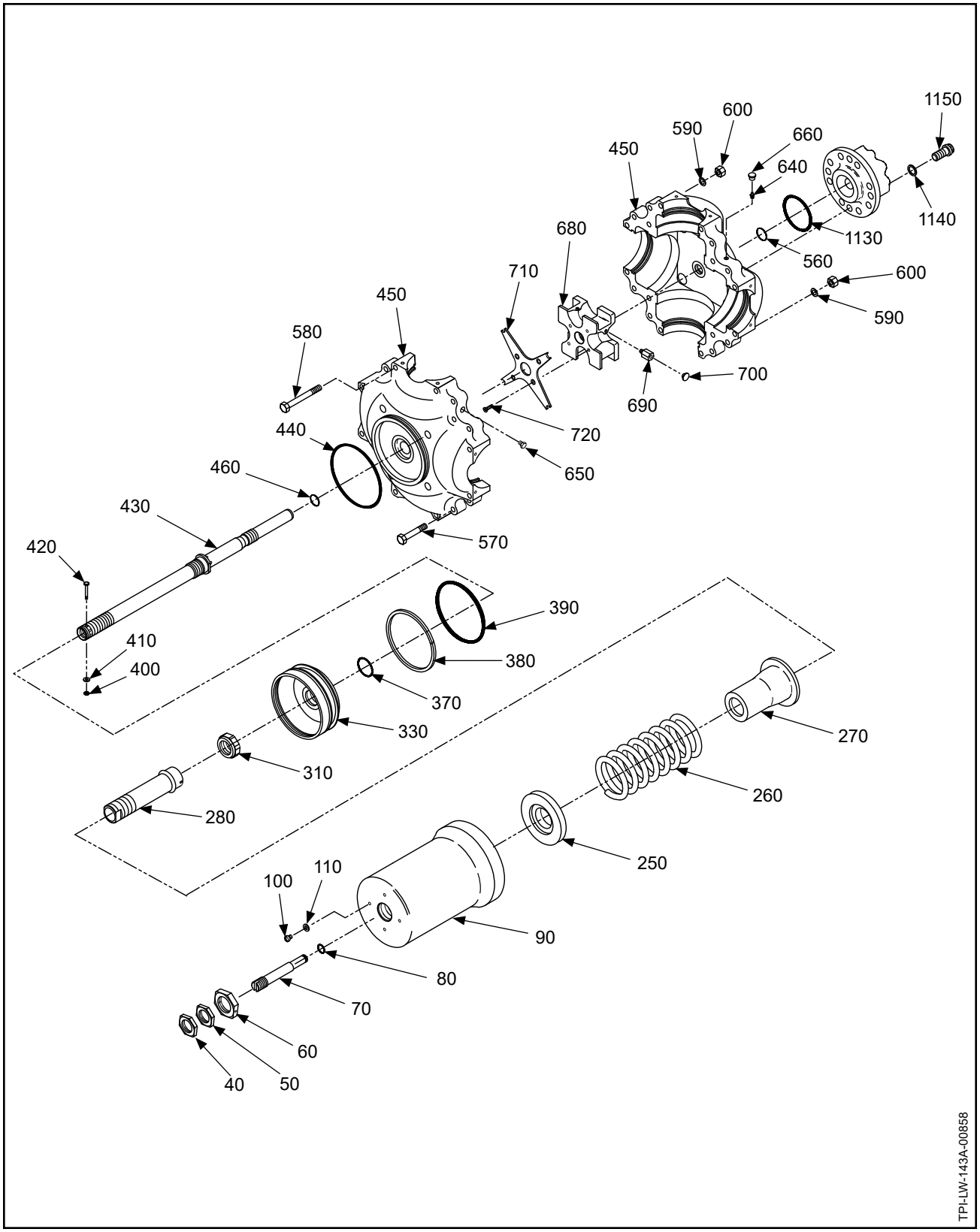
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

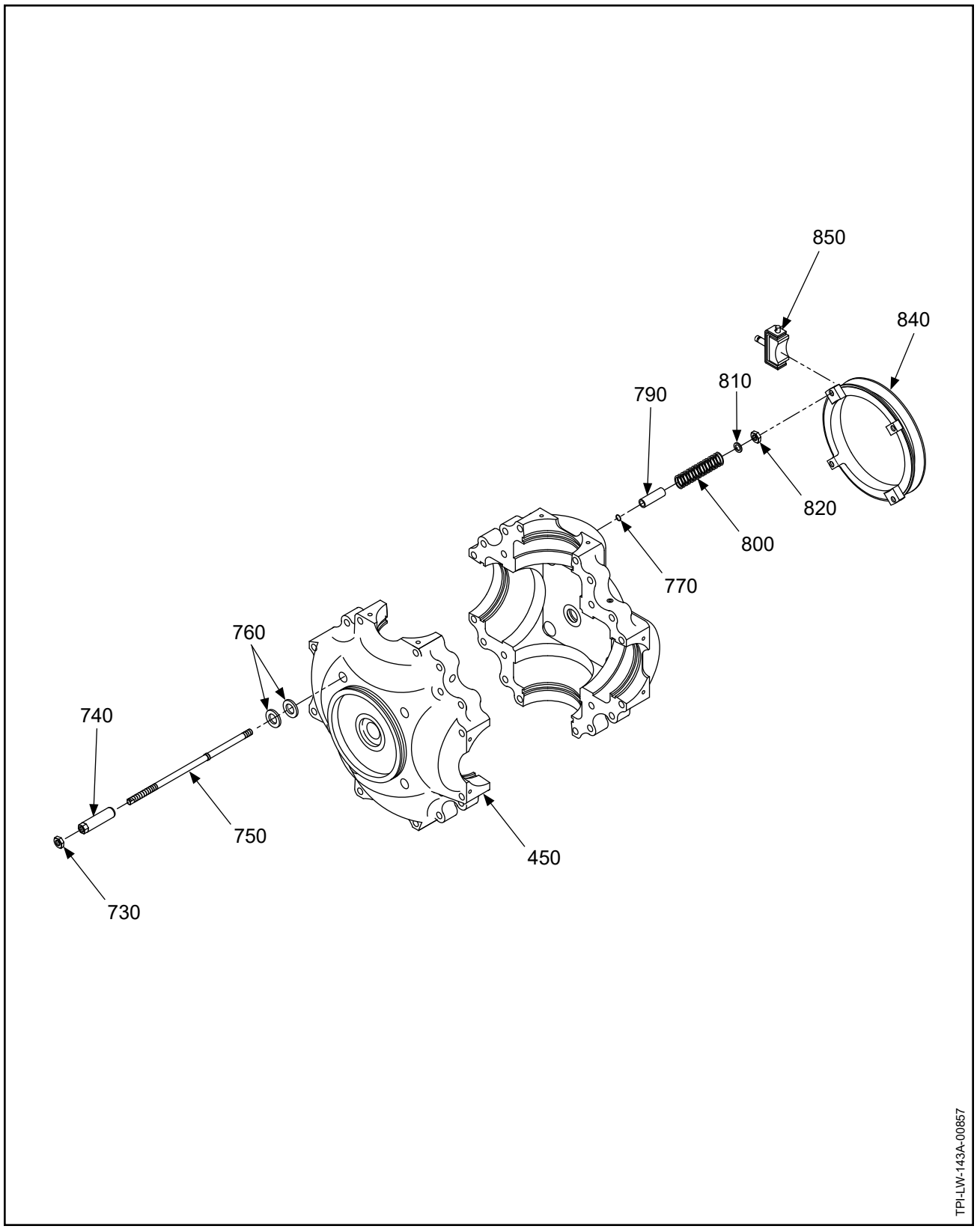
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-D4N-3N, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

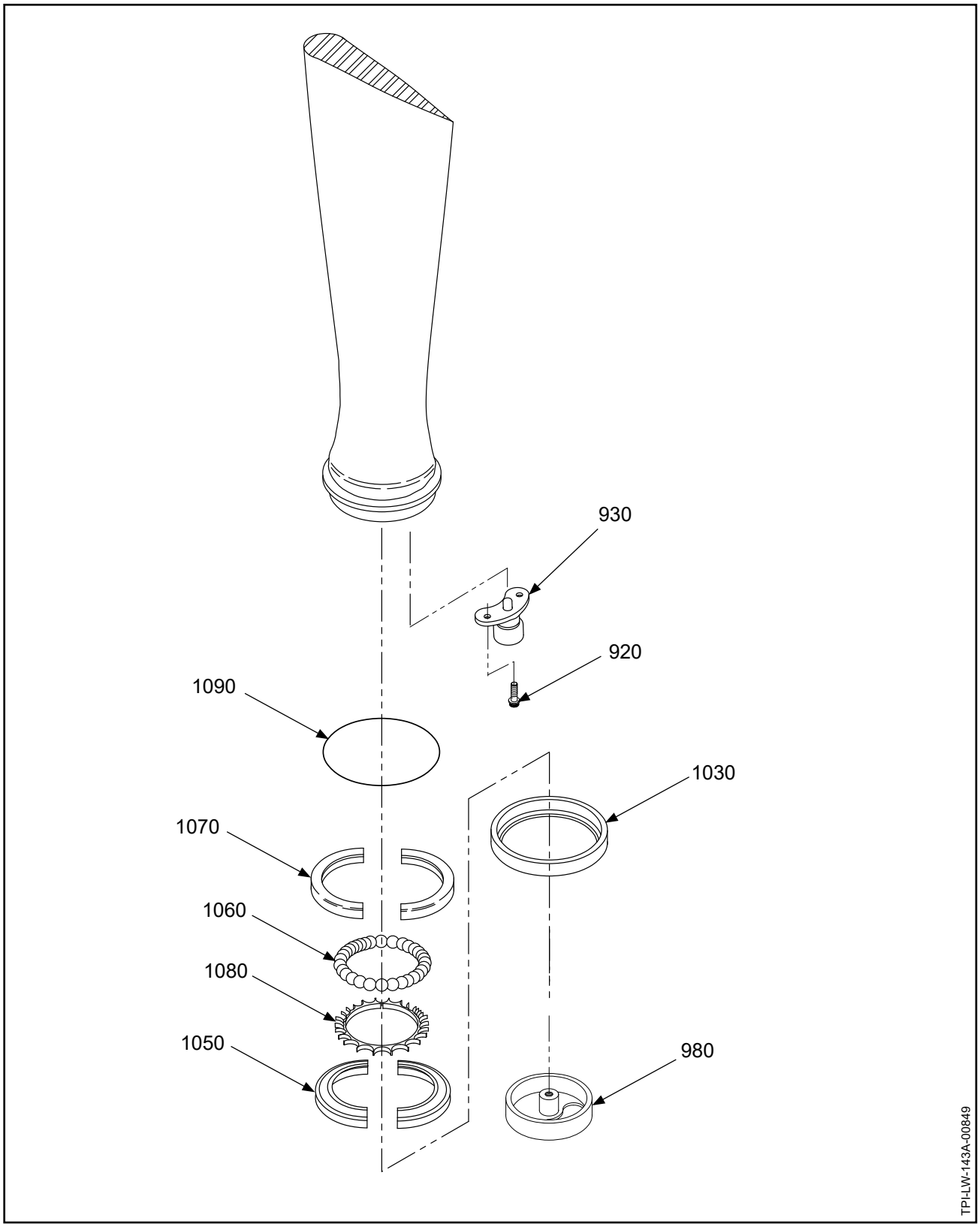
- ITEM NOT ILLUSTRATED



HC-D4N-3P, -3R: Propeller Parts
Figure 10-10



HC-D4N-3P, -3R: Beta System Parts
Figure 10-11



HC-D4N-3P, -3R: Blade Retention Parts
Figure 10-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-D4N-3P, -3R**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD, USED ONLY WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED**				
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-499-2	• PCP: HUB UNIT, D4N-3 (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-499-3	• PCP: HUB UNIT, HC-D4(N,P)-3, ALTERNATE (REFER TO “D-499-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING, ENGINE-SIDE BUSHING ID		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED**				
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	C-6475	• • PLATE, BETA PICKUP USE ONLY WITH ITEM 670A		1		
720A	B-6521-8	• • SCREW, 10-32, 100° HEAD USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED				
10-11		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4		
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BETA FEEDBACK BLOCK ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3R	1		
850A	A-3074	• BETA FEEDBACK BLOCK ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3P	1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-3P	HC-D4N-3P		
-3R	HC-D4N-3R		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED				
10-12		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are <u>per blade assembly</u>.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-431	• • PRELOAD PLATE, INCLUDED IN ITEM 980		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING, POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030, USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED				
10-12		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

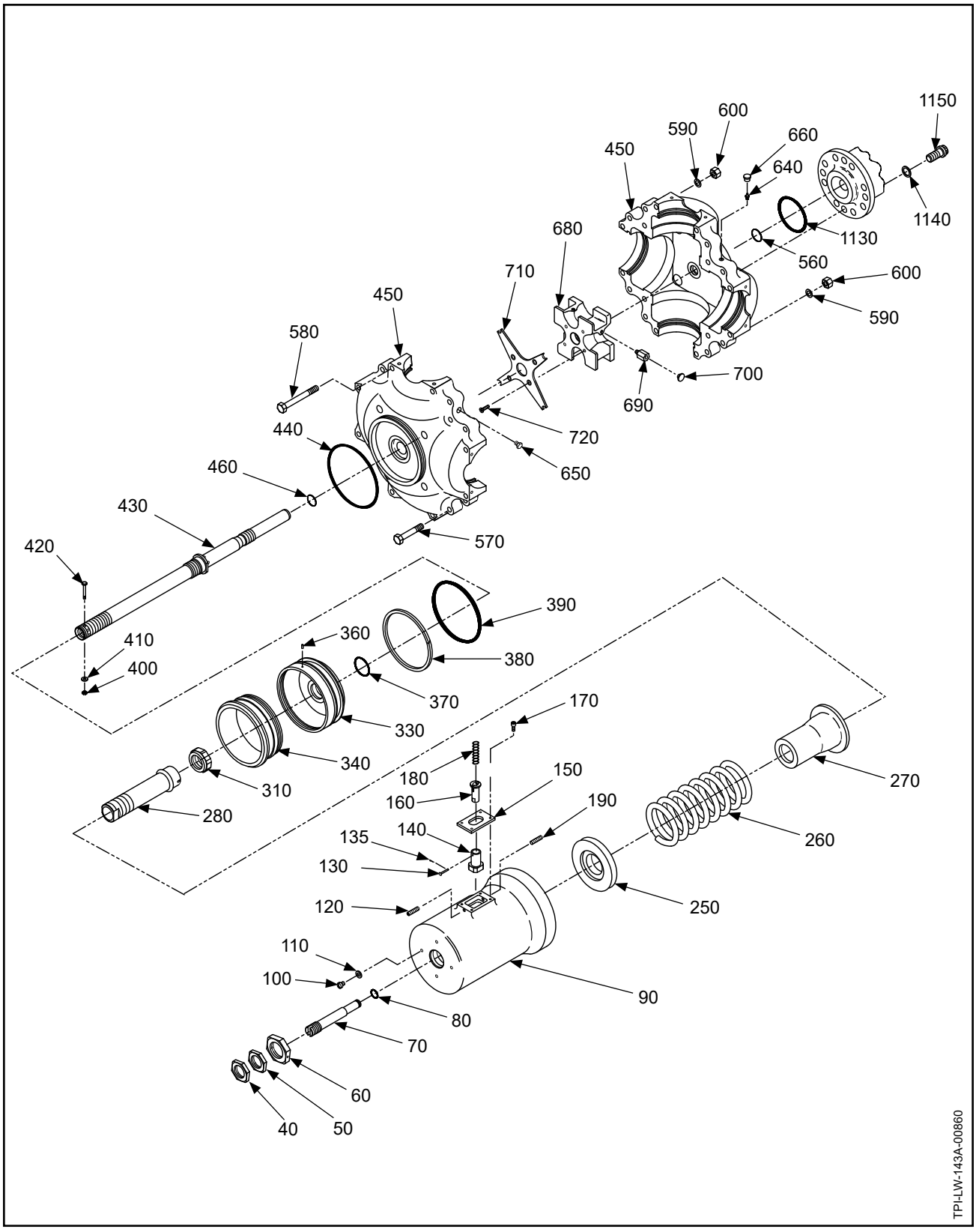
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

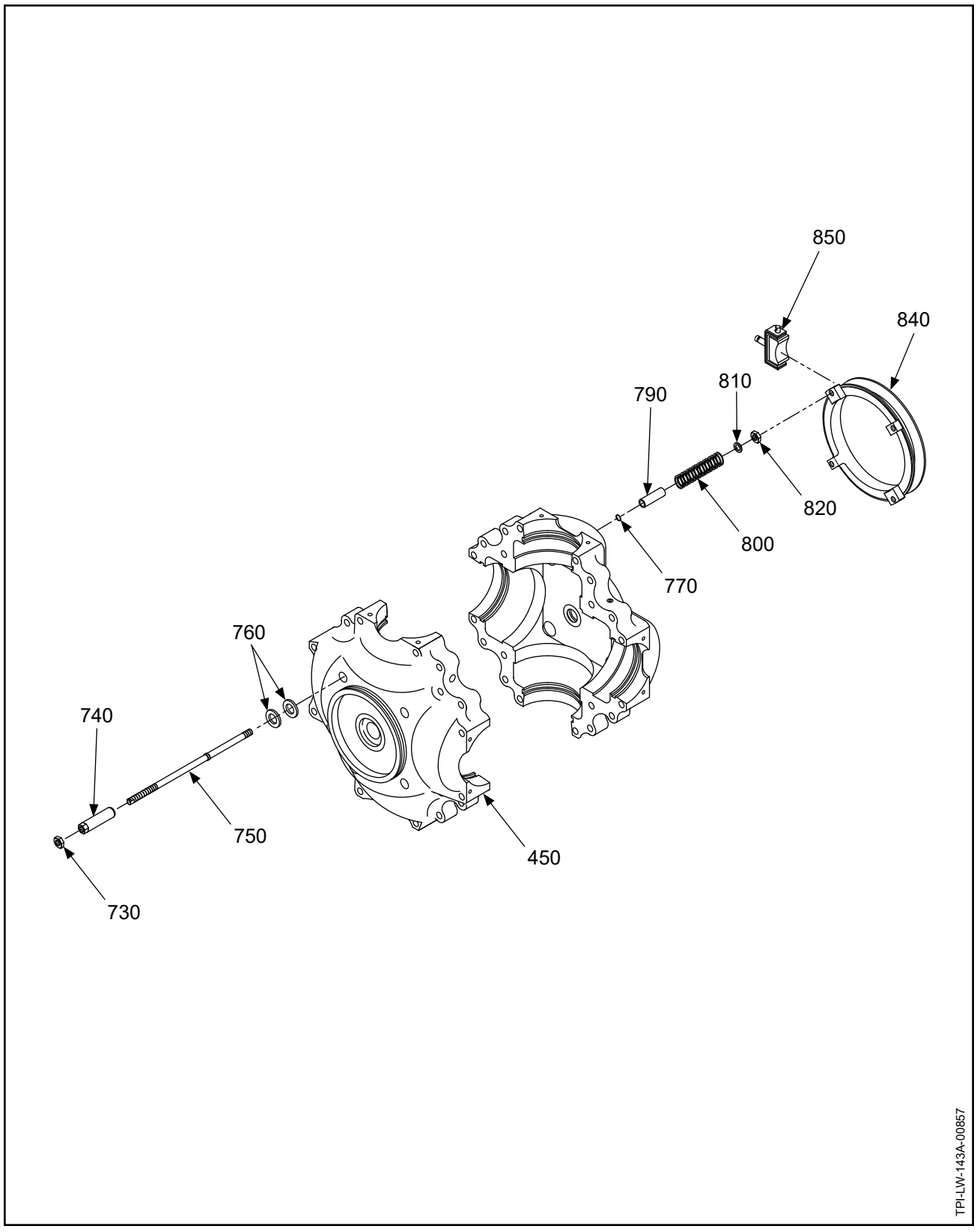
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-9040		• COUNTERWEIGHT SLUGS				
-9041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-9042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

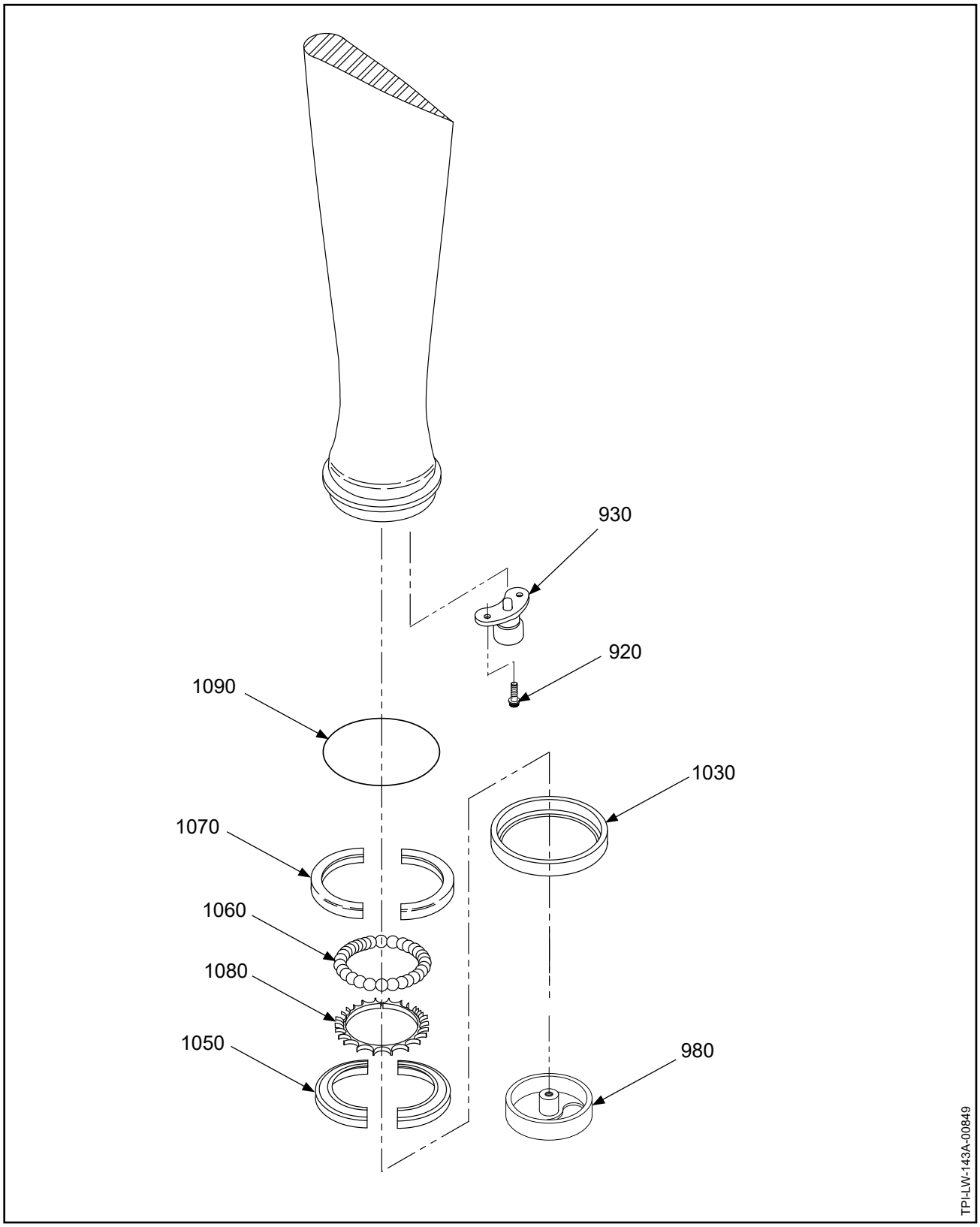
- ITEM NOT ILLUSTRATED



HC-D4N-3Q, -3T: Propeller Parts
Figure 10-13



HC-D4N-3Q, -3T: Beta System Parts
Figure 10-14



HC-D4N-3Q, -3T: Blade Retention Parts
Figure 10-15

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-D4N-3Q, -3T**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-484	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
120	B-6639-131	• SCREW, SET		4	Y	
130	B-3838-3-5	• COTTER PIN, SUPERSEDED BY ITEMS 130A &135		2	Y	
130A	B-2877	• CLEVIS PIN, 3/32, SUPERSEDES ITEM 130		2	Y	
135	B-3838-1	• COTTER PIN, SUPERSEDES ITEM 130		2	Y	
140	B-444-4	• HOUSING, START LOCK		2		
150	B-446	• COVER, HOUSING, START LOCK		2		
160	A-2620-1	• PIN, START LOCK		2		
170	B-3821	• SCREW, 10-32, CAP		8	Y	
180	B-658	• SPRING, COMPRESSION, START LOCK		2	Y	
190	B-6639-131	• SCREW, SET		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD, ONLY USED WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-D4N-3Q, -3T, CONTINUED**				
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
320	C-497	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
340	B-493	• • RING, PISTON, START LOCK		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-D4N-3Q, -3T, CONTINUED**				
450	D-499-2	• PCP: HUB UNIT, D4N-3 (REFER TO "D-499-( ) HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-499-3	• PCP: HUB UNIT, HC-D4(N,P)-3, ALTERNATE (REFER TO "D-499-( ) HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD, USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY, SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720A	B-6521-8	• • SCREW, 10-32, 100° HEAD, USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3Q, -3T, CONTINUED				
10-14		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3Q, -3T, CONTINUED				
10-15		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY, REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-431	• • PRELOAD PLATE, INCLUDED IN ITEM 980		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING, POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030, USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-D4N-3P, -3R, CONTINUED				
10-12		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090A, SUPERSEDED BY ITEM 1090B		1	Y	
1090A	C-3317-340-3	• O-RING (BLADE MOUNTING) ALTERNATE FOR ITEM 1090, SUPERSEDED BY ITEM 1090		1	Y	
1090B	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

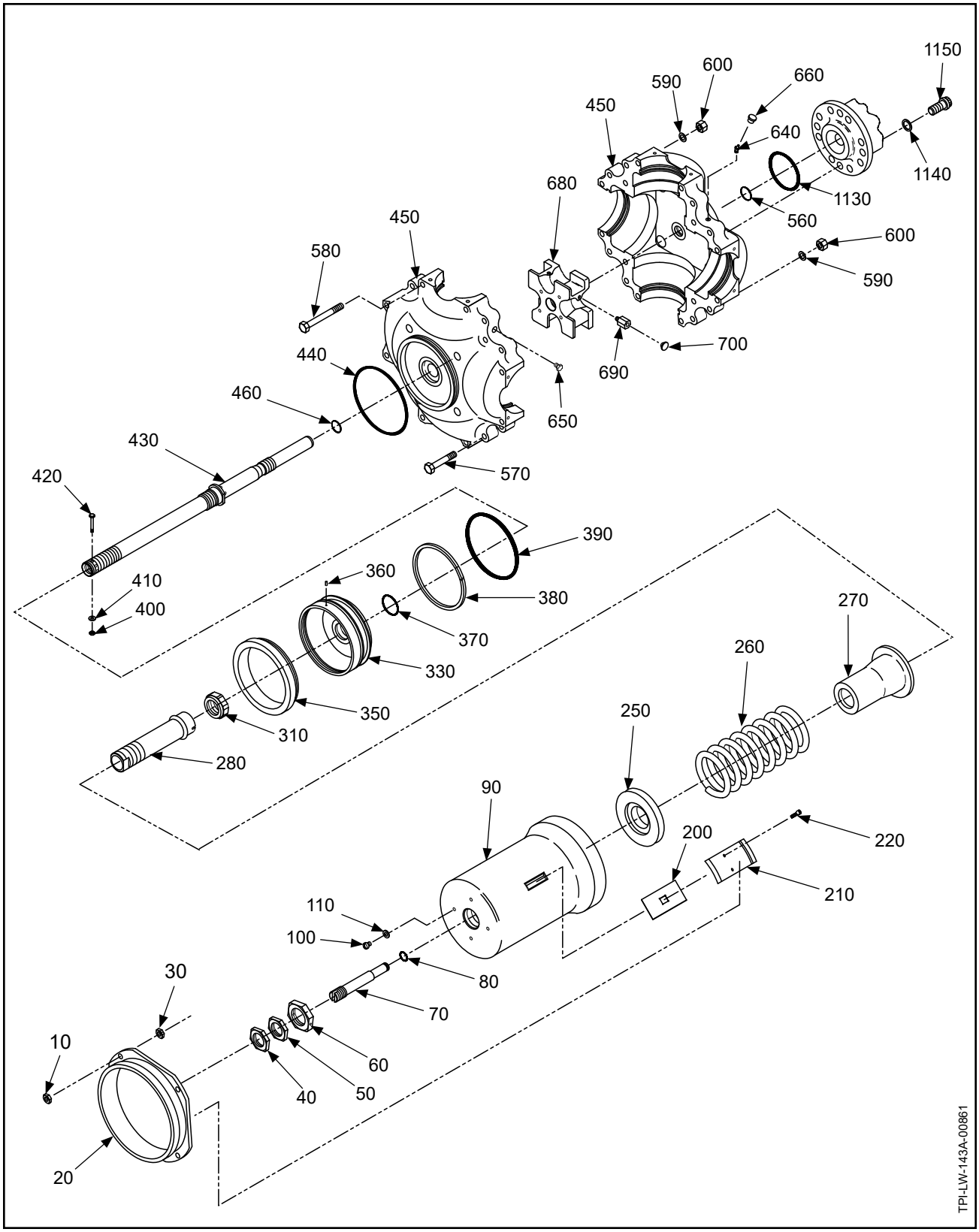
- ITEM NOT ILLUSTRATED

HC-D4N-3Q, -3T

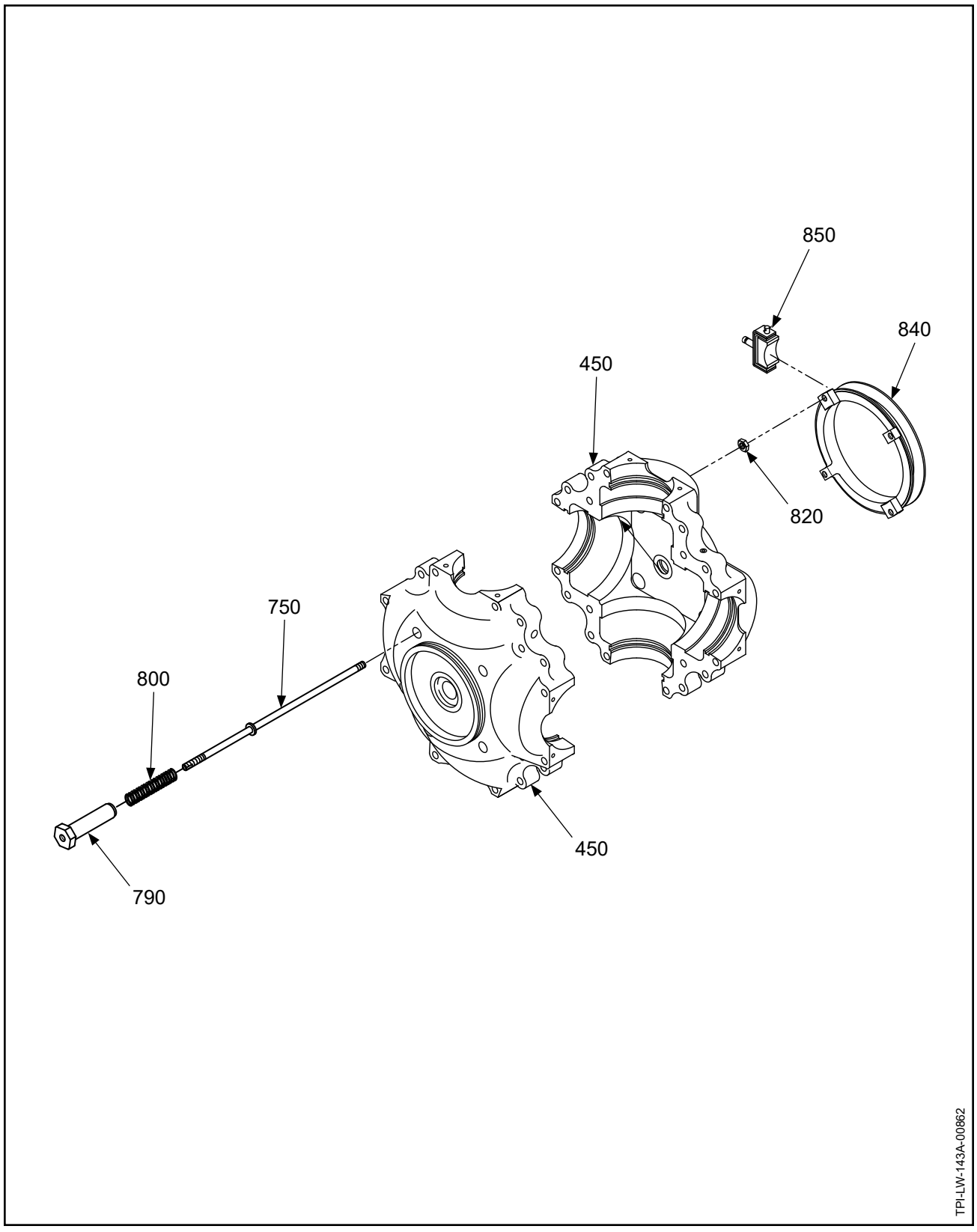
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-D4N-3Q, -3T, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

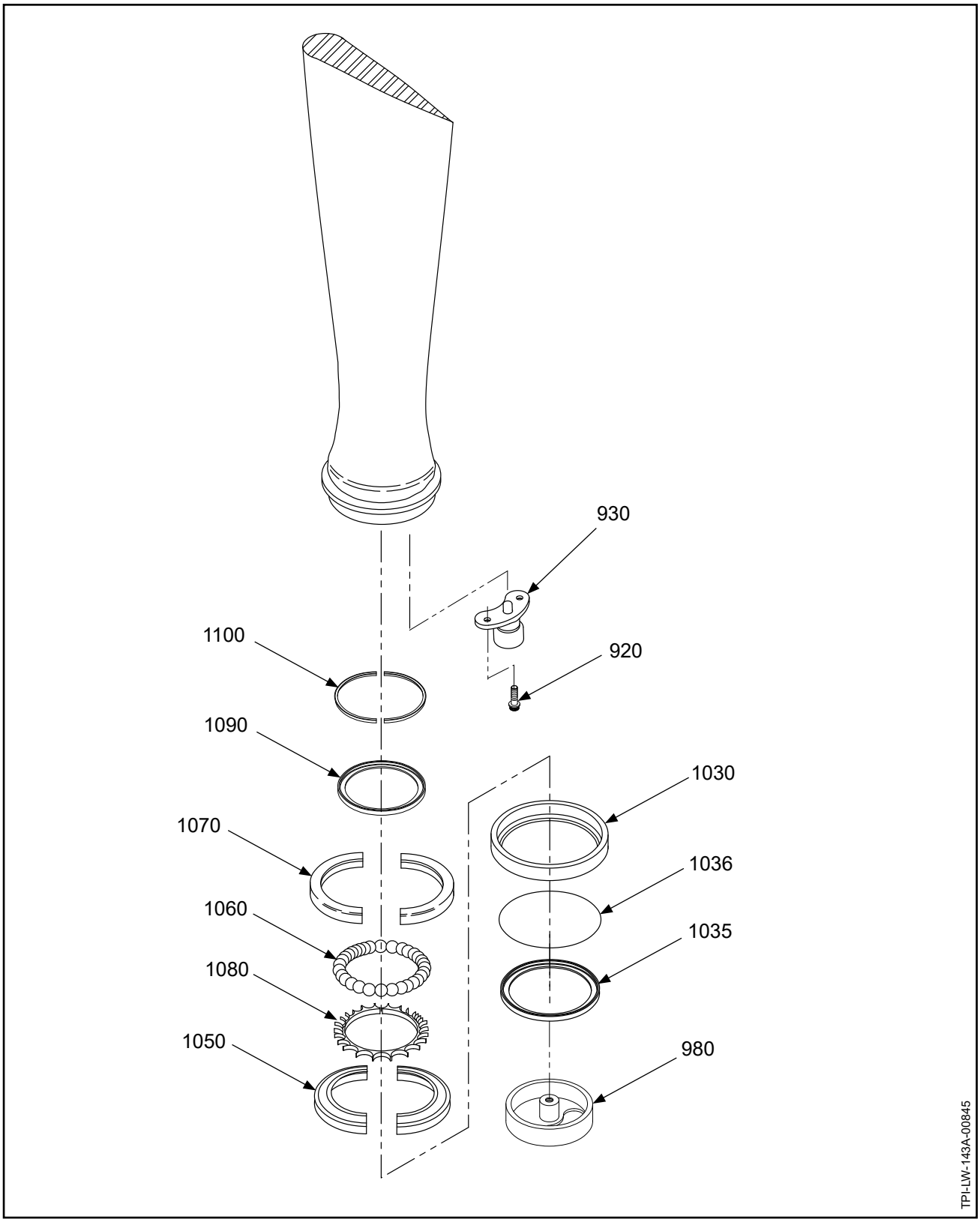
- ITEM NOT ILLUSTRATED



HC-E4A-3A: Propeller Parts
Figure 10-16



HC-E4A-3A: Beta System Parts
Figure 10-17



HC-E4A-3A: Blade Retention Parts
Figure 10-18

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E4A-3A**				
10	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
20	C-691	• BETA YOKE		1		
30	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-5158-1	• PCP: CYLINDER, SUPERSEDED BY ITEM 90A		1		PCP
90A	D-1657	• PCP: CYLINDER, SUPERSEDES ITEM 90		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
200	A-1683-2	• TAPPET BUSHING		2	Y	
210	C-1174-2	• YOKE TAPPET		2		
220	B-3819	• SCREW, SUPERSEDED BY ITEM 220A		4	Y	
220A	B-3829	• SCREW, SUPERSEDES ITEM 220		4	Y	
250	B-6768	• SPRING RETAINER, FOWARD, USED ONLY WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E4A-3A, CONTINUED**				
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-2864	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
350	C-208	• • PISTON BUSHING		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	E-393	• PCP: HUB, SUPERSEDED BY ITEM 450A		1		PCP
450A	E-393-1	• PCP: HUB, SUPERSEDES ITEM 450 SUPERSEDED BY ITEM 450B		1		PCP
450B	E-393-2	• PCP: HUB HC-E4A-3( ), SUPERSEDES ITEM 450A (REFER TO “E-393-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E4A-3A, CONTINUED**				
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
610	A-80-7	• HEX HEAD BOLT, LIGHTNING		4	Y	
620	B-3808-3	• NUT, HEX, SELF-LOCKING		4	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-635	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-1	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680A	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680B	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680 AND 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3A, CONTINUED				
10-17		**BETA SYSTEM PARTS**				
750	B-671-3	• ROD, BETA, SUPERSEDED BY ITEM 750A		4		
750A	B-671	• ROD, BETA, SUPERSEDES ITEM 750		4		
790	B-5613	• SPRING TUBE, SUPERSEDED BY ITEM 790A		4		
790A	B-2837	• SPRING TUBE, SUPERSEDES ITEM 790		4		
800	B-668	• SPRING, COMPRESSION, BETA		4	Y	
820	B-3368	• NUT, 5/16-24, HEX, THIN		4	Y	
840	C-673	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3A, CONTINUED				
10-18		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A		2	Y	
920A	B-3830	• TWELVE POINT BOLT, REPLACES ITEM 920		2	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “100032-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	B-6257-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930A ALTERNATE FOR ITEM 930, POST HC-SB-61-346 (REFER TO “B-6257-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-6259	• PRELOAD PLATE ASSEMBLY REPLACED BY ITEM 980A, (REFER TO “C-6259 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641-1	• PRELOAD PLATE ASSEMBLY, REPLACES ITEM 980 POST HC-SB-61-278 (REFER TO “100641-( ) PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-659	• PRELOAD PLATE, SUPERSEDED BY ITEM 990A		1		
-990A	C-6172	• PRELOAD PLATE, SUPERSEDES ITEM 990 SUPERSEDED BY ITEM 990B		1		
-990B	C-6255	• PRELOAD PLATE, SUPERSEDES ITEM 990A SUPERSEDED BY ITEM 980		1		
1010	A-3204-1	• SCREW, SET, 5/16-24, REPLACED BY ITEM 1010A USE WITH ITEMS 990, 990A, 990B		1	Y	
1010A	A-3204	• SCREW, SET, 5/16-24, REPLACES ITEM 1010 REPLACED BY ITEM 1010B, USE WITH ITEM 980 POST SB185		1	Y	
1010B	A-3204-2	• SCREW, SET, 5/16-24, REPLACES ITEM 1010A REPLACED BY ITEM 1010C USE WITH ITEMS 990, 990A, 990B, 980		1	Y	
1010C	B-7019-2	• SCREW, SET, 5/16-24, POST HC-SL-61-195 USE WITH ITEM 980, 980A		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
1030	B-1041	• RING, RETAINING, BEARING, SUPERSEDED BY ITEM 1030A		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3A, CONTINUED				
10-18		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are per blade assembly.**				
1030A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1030, POST HC-SL-61-241		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	D-7745	• BEARING, RETENTION, BLADE		1		
1050	D-7745-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	D-7745-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-6337-1	• BLADE SEAL, USED WITH ITEM 1100 SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEMS 1090 AND 1100, POST HC-SL-61-303		1	Y	
1100	B-6376-3	• SEAL ENERGIZER RING, USED WITH ITEM 1090 SUPERSEDED BY ITEM 1090A		1	Y	

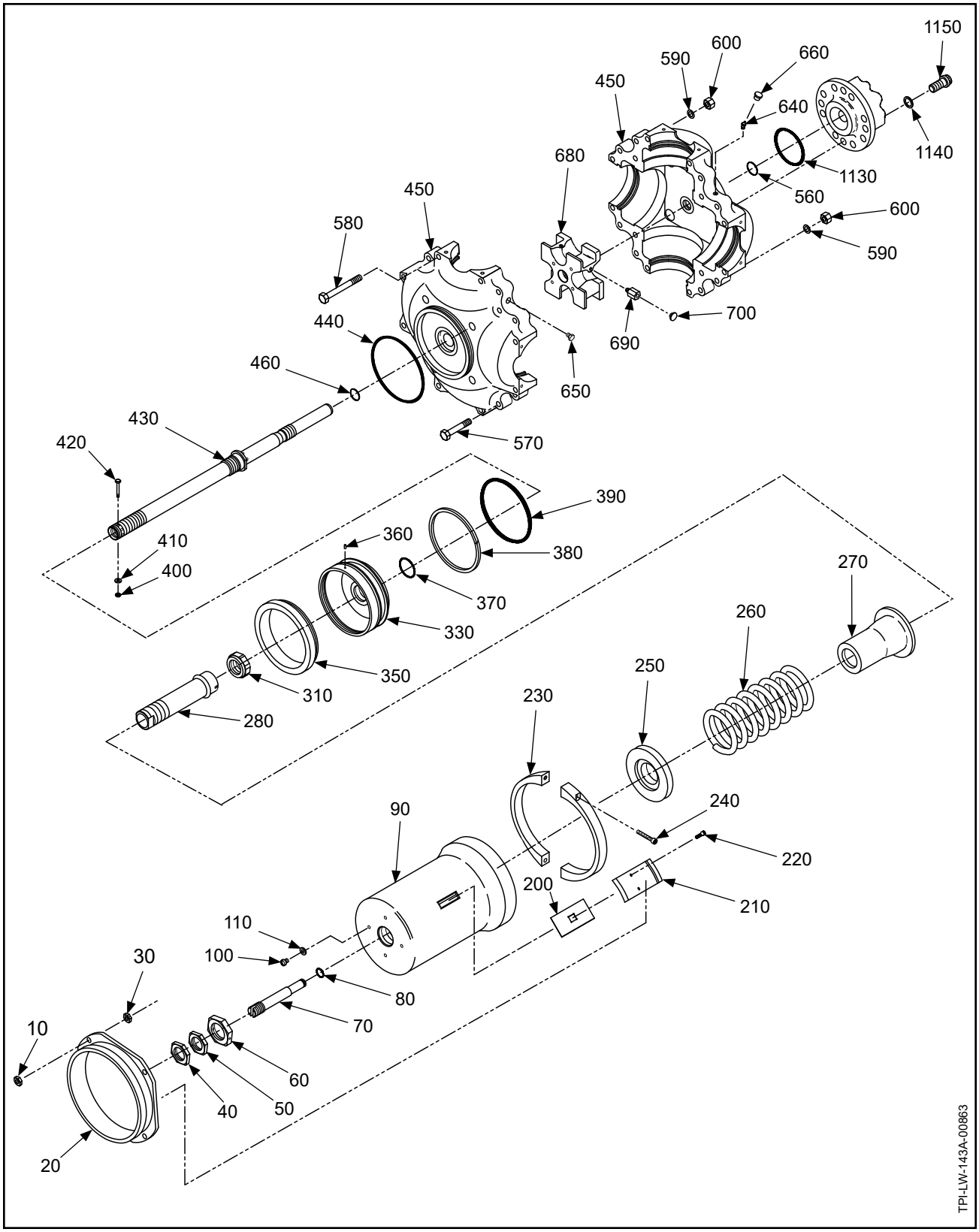
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

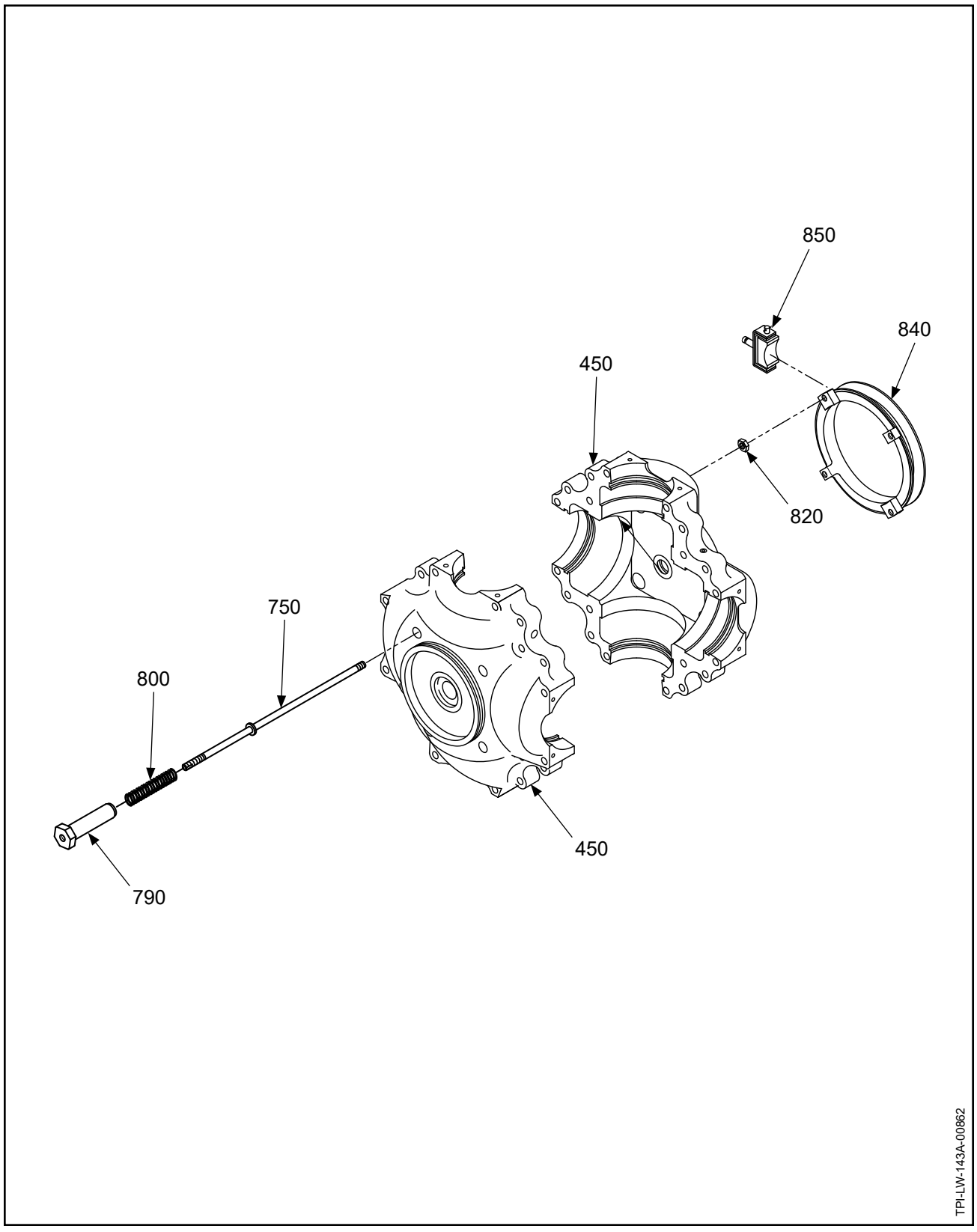
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		PROPELLER PARTS - HC-E4A-3A, CONTINUED				
		BALANCE PARTS				
-1110	A-2016	• HEX HEAD BOLT		A/R	Y	
-1120	A-2424( )	• BALANCE WEIGHT		A/R		
		PROPELLER MOUNTING PARTS				
1130	C-3317-239-2	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1150	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-9040		• COUNTERWEIGHT SLUGS				
-9041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-9042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

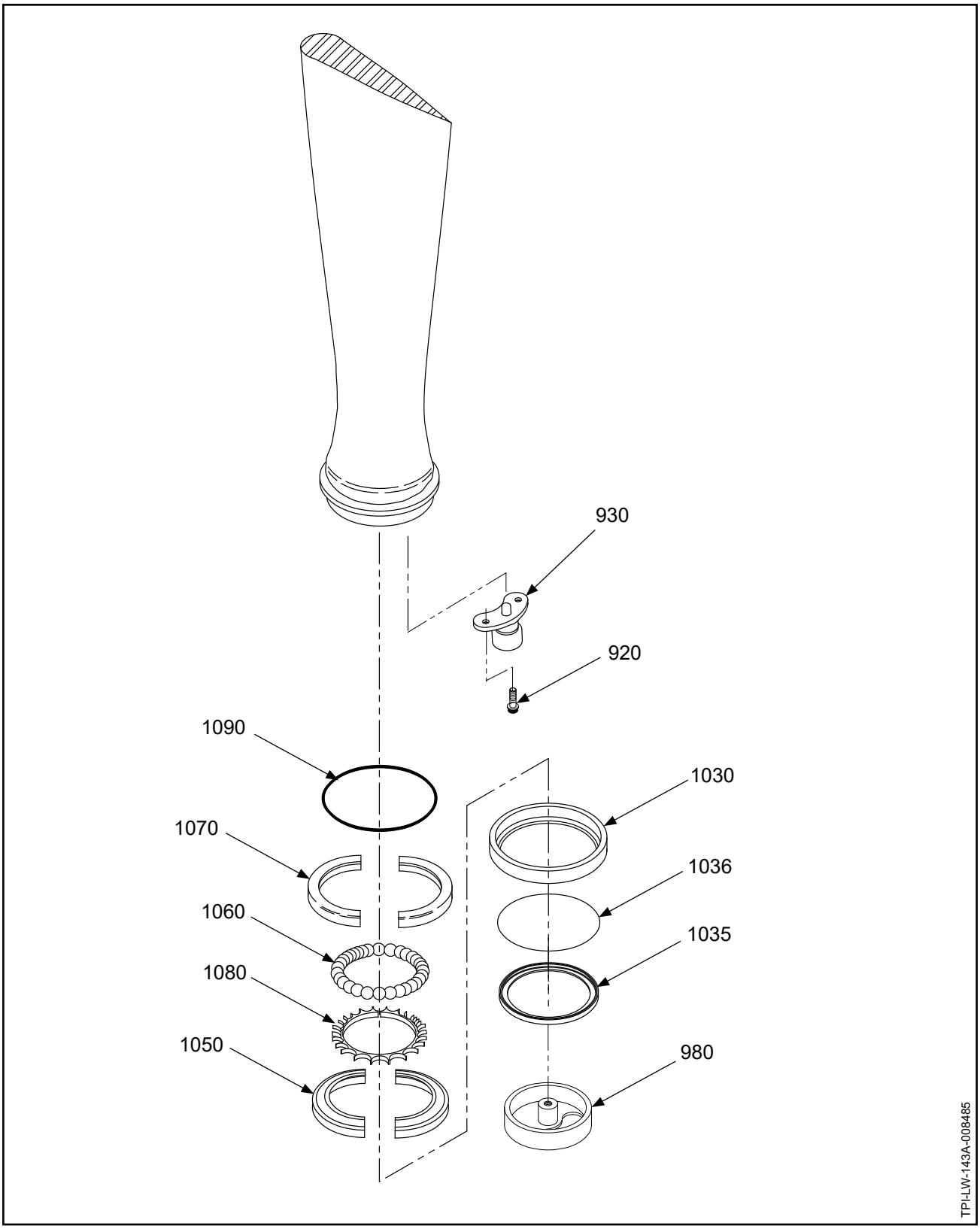
- ITEM NOT ILLUSTRATED



HC-E4A-3D: Propeller Parts
Figure 10-19



HC-E4A-3D: Beta System Parts
Figure 10-20



HC-E4A-3D: Blade Retention Parts
Figure 10-21

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E4A-3D**				
10	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
20	C-691	• BETA YOKE		1		
30	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-1657	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
200	A-1683-2	• TAPPET BUSHING		2	Y	
210	C-1174-2	• YOKE TAPPET		2		
220	B-3829	• SCREW		4	Y	
230	B-6472	• CYLINDER CLAMP		1		
240	A-2038-12	• SOCKET HEAD CAP SCREW		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD, ONLY USED WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E4A-3D, CONTINUED**				
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• • PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-2864	• PISTON UNIT, SUPERSEDED BY ITEM 320A		1		
330	C-492	• • PISTON		1		
350	C-208	• • PISTON BUSHING, SUPERSEDED BY ITEM 350A		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
-320A	C-2864-1	• PISTON UNIT, SUPERSEDES ITEM 320		1		
330A	C-492	• • PISTON		1		
350A	C-208-1	• • PISTON BUSHING, SUPERSEDES ITEM 350		1		
360A	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15H	• BOLT, 10-32, HEX HEAD SUPERSEDED BY ITEM 420A		1	Y	
420A	B-3383-15	• BOLT, 10-32, HEX HEAD, SUPERSEDES ITEM 420 NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E4A-3D, CONTINUED**				
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	E-393-1	• PCP: HUB, SUPERSEDED BY ITEM 450A		1		PCP
450A	E-393-2	• PCP: HUB UNIT HC-E4A-3( ), SUPERSEDES ITEM 450 (REFER TO “E-393-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-635	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-1	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680A	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680B	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680 AND 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3D, CONTINUED				
10-20		**BETA SYSTEM PARTS**				
750	B-671-4	• ROD, BETA		4		
790	B-2837	• SPRING TUBE		4		
800	B-668	• SPRING, COMPRESSION, BETA		4	Y	
820	B-3368	• NUT, 5/16-24, HEX, THIN		4	Y	
840	C-673	• BETA RING		1		
850	A-3074	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3074 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3D, CONTINUED				
10-21		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	B-6209	• PRELOAD PLATE ASSEMBLY, SUPERSEDES ITEM 990A REPLACED BY ITEM 980A (REFER TO “C-6209 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641	• PRELOAD PLATE, REPLACES ITEM 980 POST HC-SB-61-278 (REFER TO “100641-( ) PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-659	• PRELOAD PLATE, SUPERSEDED BY ITEM 990A		1		
-990A	C-6172	• PRELOAD PLATE, SUPERSEDES ITEM 990 SUPERSEDED BY ITEM 980		1		
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
1030	A-2204	• RING, RETAINING, BEARING, SUPERSEDED BY ITEM 1030A		1		
1030A	B-1041	• RING, RETAINING, BEARING, SUPERSEDED BY ITEM 1030B		1		
1030B	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1030A, POST HC-SL-61-241		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030B		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030B		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3D, CONTINUED				
10-21		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are <u>per blade assembly</u>.**				
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING), SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

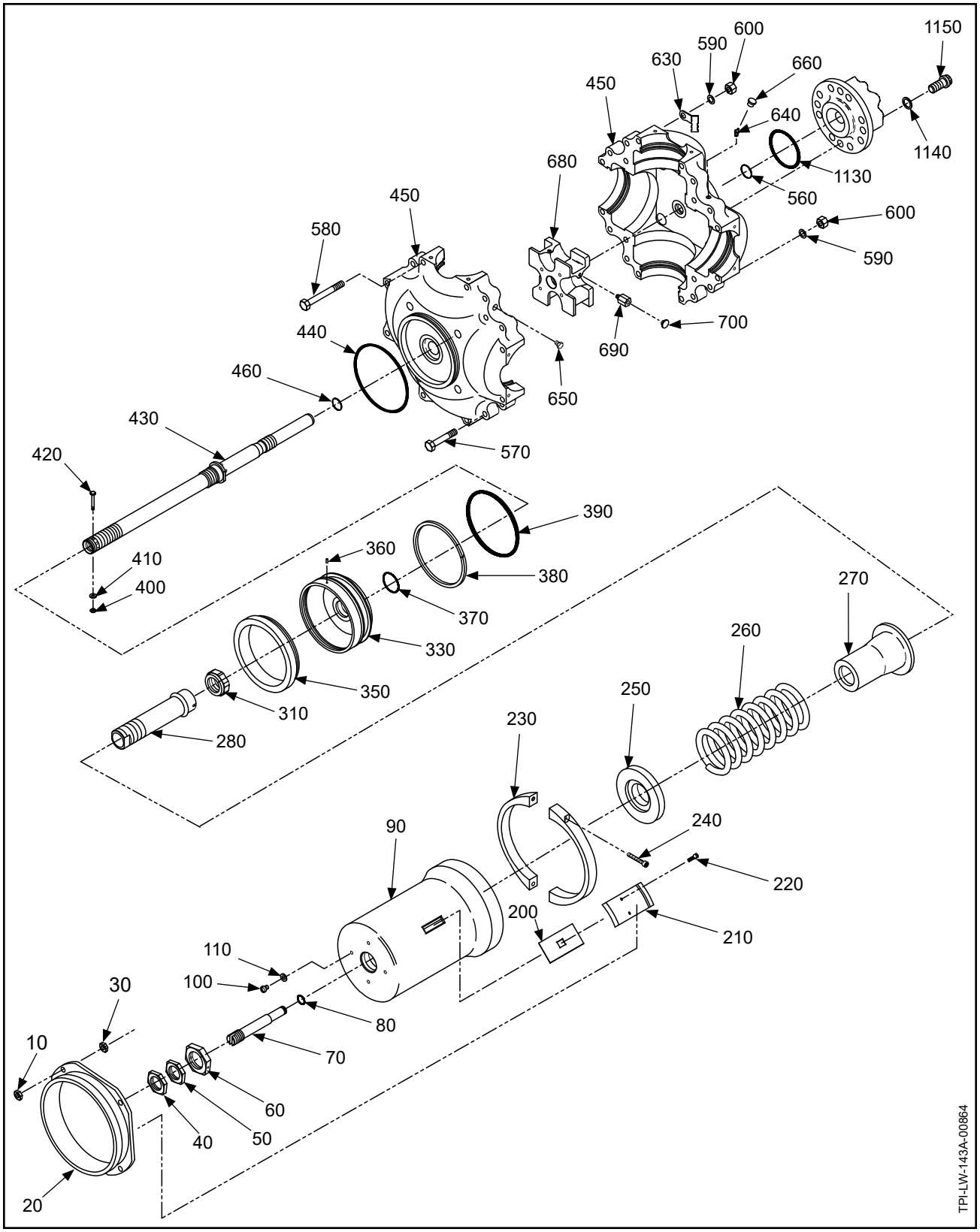
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

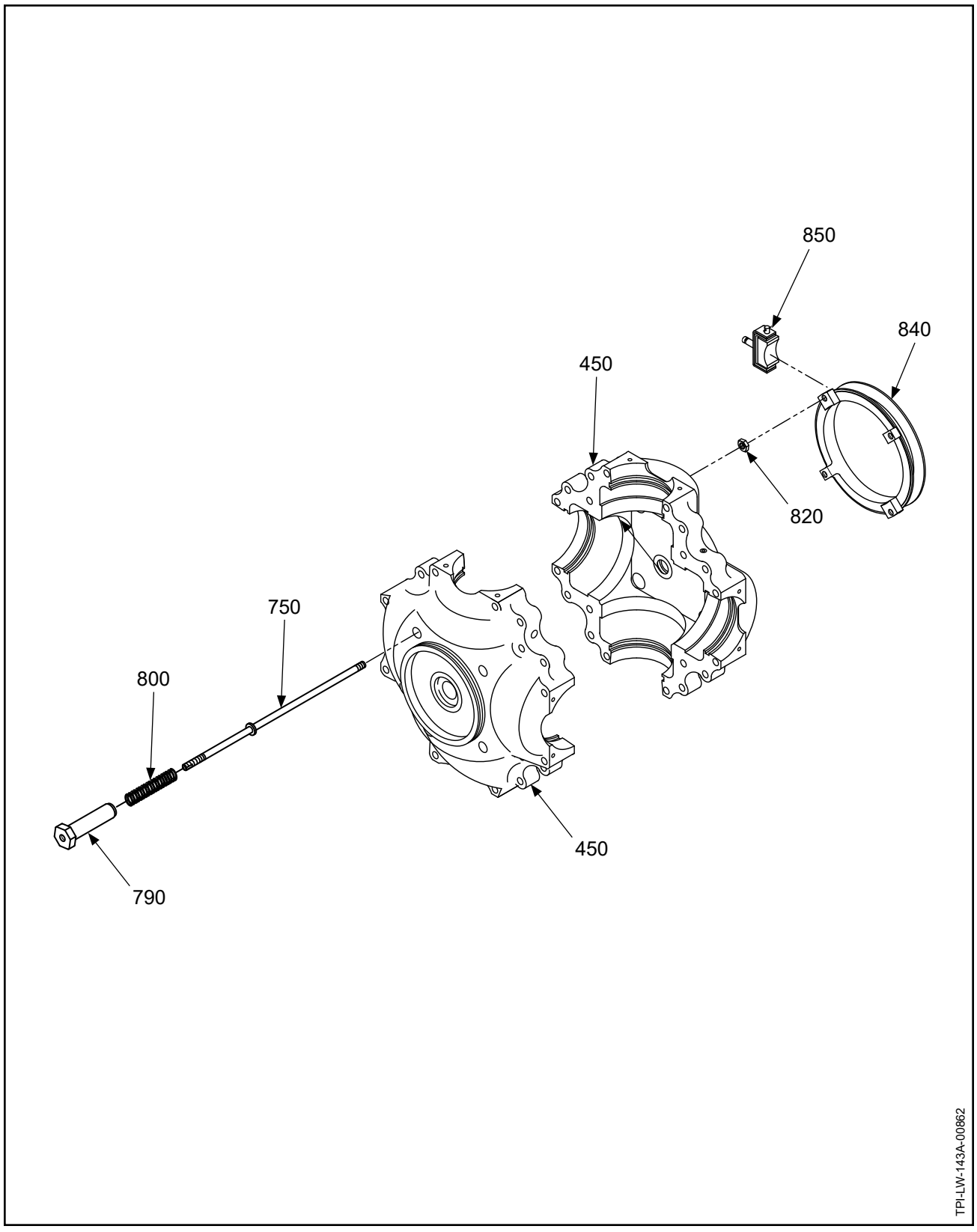
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E4A-3D, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-239-2	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1150	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES				
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

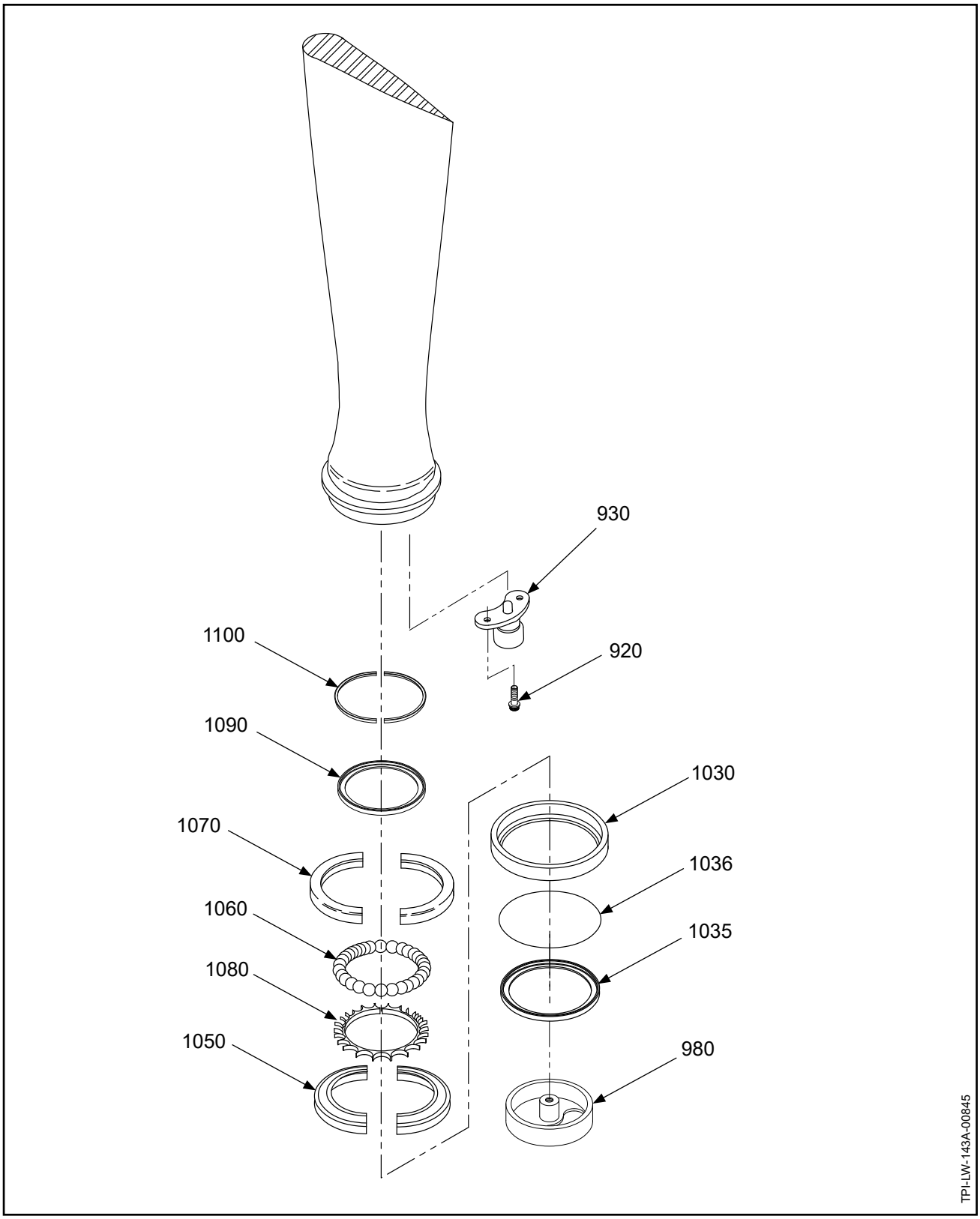
- ITEM NOT ILLUSTRATED



HC-E4A-3I: Propeller Parts
Figure 10-22



HC-E4A-3I: Beta System Parts
Figure 10-23



HC-E4A-3I: Blade Retention Parts
Figure 10-24

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E4A-3I**				
10	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
20	C-691	• BETA YOKE		1		
30	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-1657	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
200	A-1683-2	• TAPPET BUSHING		2	Y	
210	C-1174-2	• YOKE TAPPET		2		
220	B-3829	• SCREW		4	Y	
230	B-6472	• CYLINDER CLAMP		1		
240	A-2038-12	• SOCKET HEAD CAP SCREW		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD, ONLY USED WITH ITEMS 260A, 270A AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E4A-3I, CONTINUED**				
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-2864	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
350	C-208	• • PISTON BUSHING		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING, NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD, NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E4A-3I, CONTINUED**				
450	E-393-2	• PCP: HUB UNIT, HC-E4A-3( ) (REFER TO "E-393-( ) HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
610	A-80-7	• HEX HEAD BOLT, LIGHTNING		4	Y	
620	B-3808-3	• NUT, HEX, SELF-LOCKING		4	Y	
630	B-6265	• WIRE HARNESS BRACKET		4		
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-635	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-1	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680A	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680B	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680 AND 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3I, CONTINUED				
10-23		**BETA SYSTEM PARTS**				
750	B-671	• ROD, BETA		4		
790	B-2837	• SPRING TUBE		4		
800	B-668	• SPRING, COMPRESSION, BETA		4	Y	
820	B-3368	• NUT, 5/16-24, HEX, THIN		4	Y	
840	C-673	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3I, CONTINUED				
10-24		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3830	• TWELVE POINT BOLT		2	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT, (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-6257-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 (REFER TO "B-6257-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-6259	• PRELOAD PLATE ASSEMBLY, SUPERSEDES ITEM 980, REPLACED BY ITEM 980A (REFER TO "C-6259 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641-1	• PRELOAD PLATE ASSEMBLY, REPLACES ITEM 980, POST HC-SB-61-278 (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-6255	• PRELOAD PLATE, SUPERSEDED BY ITEM 980		1		
1010	A-3204	• SCREW, SET, 5/16-24, REPLACED BY ITEM 1010A, USE WITH ITEM 980		1	Y	
1010A	A-3204-2	• SCREW, SET, 5/16-24, REPLACES ITEM 1010 REPLACES ITEM 1010, POST HC-SL-61-185 REPLACED BY ITEM 1010B		1	Y	
1010B	B-7019-2	• SCREW, SET, 5/16-24, REPLACES ITEM 1010A POST HC-SL-61-195		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
1030	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1030A		1		
1030A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1030, POST HC-SL-61-241		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE SUPERSEDED BY ITEM 1040A REPLACED BY ITEM 1040B		1		
1050	C-792-B	• • RACE, BLADE SIDE SUPERSEDED BY ITEM 1050A, REPLACED BY ITEM 1050B		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
1070	C-792-A	• • RACE, HUB SIDE SUPERSEDED BY ITEM 1070B, REPLACED BY ITEM 1070B		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3I, CONTINUED				
10-24		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are <u>per blade assembly</u>.**				
-1040A	C-792-1	• BEARING, RETENTION, BLADE SUPERSEDED BY ITEM 1040B REPLACED BY ITEM 1040B		1		
1050A	C-792-1-B	• • RACE, BLADE SIDE SUPERSEDED BY ITEM 1050B REPLACED BY ITEM 1050B		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070A	C-792-1-A	• • RACE, HUB SIDE SUPERSEDED BY ITEM 1070B REPLACED BY ITEM 1070B		1		
-1040B	D-7745	• BEARING, RETENTION, BLADE SUPERSEDES ITEM 1040A REPLACES ITEMS 1040 AND 1040A, POST HC-SB-61-287		1		
1050B	D-7745-B	• • RACE, BLADE SIDE SUPERSEDES ITEM 1050A REPLACES ITEMS 1050 AND 1050A, POST HC-SB-61-287 SUPERSEDED BY ITEM 1050C		1		
1050C	D-7745-B	• • BLADE-SIDE BLADE BEARING RACE PART OF THE BLADE IPL, POST HC-SL-61-288		RF		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070B	D-7745-A	• • RACE, HUB SIDE SUPERSEDES ITEM 1070A REPLACES ITEMS 1070 AND 1070A, POST HC-SB-61-287		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-3	• O-RING (BLADE MOUNTING) SUPERSEDED BY ITEMS 1090A AND 1100		1	Y	
1090A	C-6337-1	• BLADE SEAL, USED WITH ITEM 1100 SUPERSEDES ITEM 1090 SUPERSEDED BY ITEM 1090B		1	Y	
1090B	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEMS 1090A AND 1100, POST HC-SL-61-303		1	Y	
1100	B-6376-3	• SEAL ENERGIZER RING, USED WITH ITEM 1090A SUPERSEDES ITEM 1090 SUPERSEDED BY ITEM 1090B		1	Y	

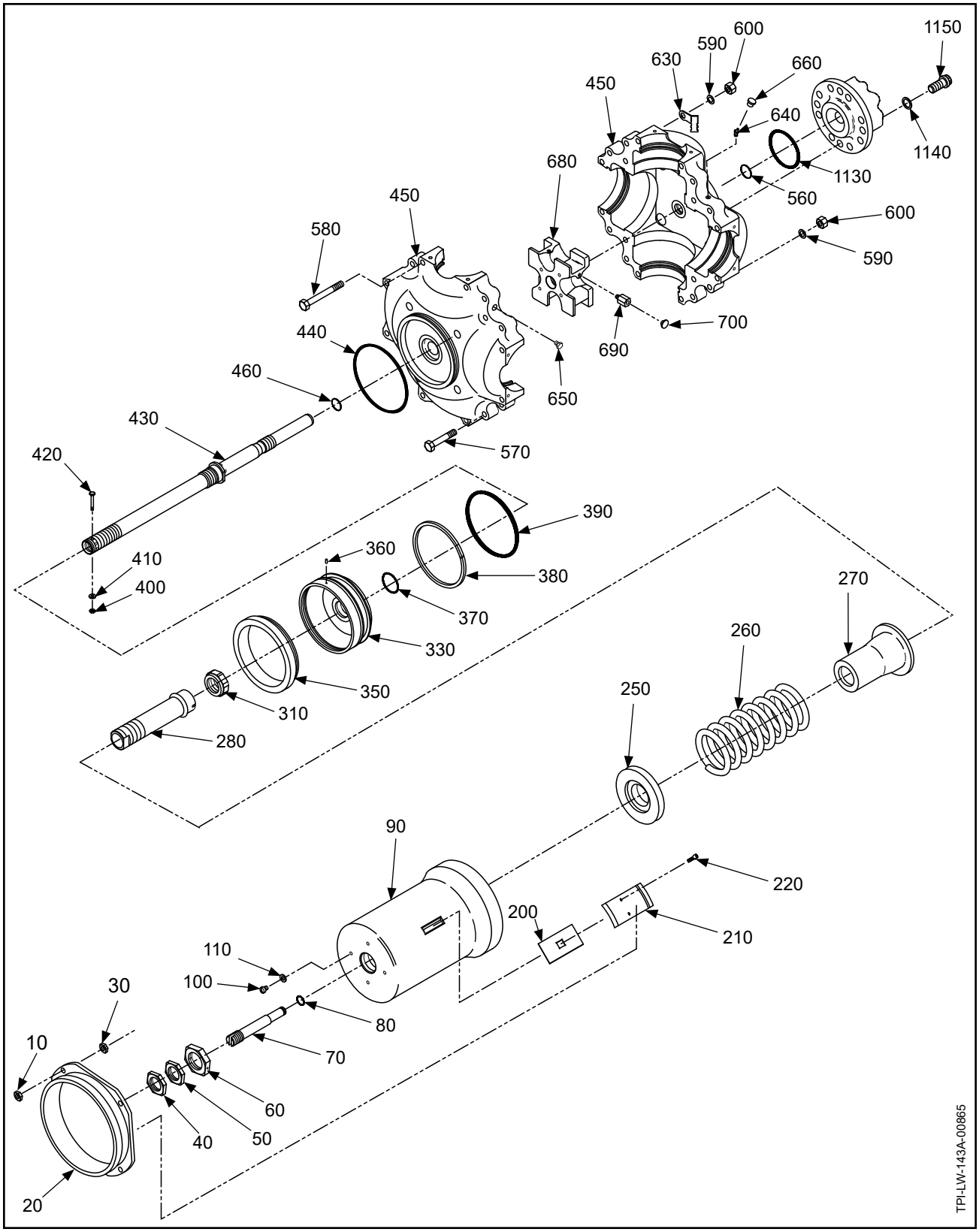
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

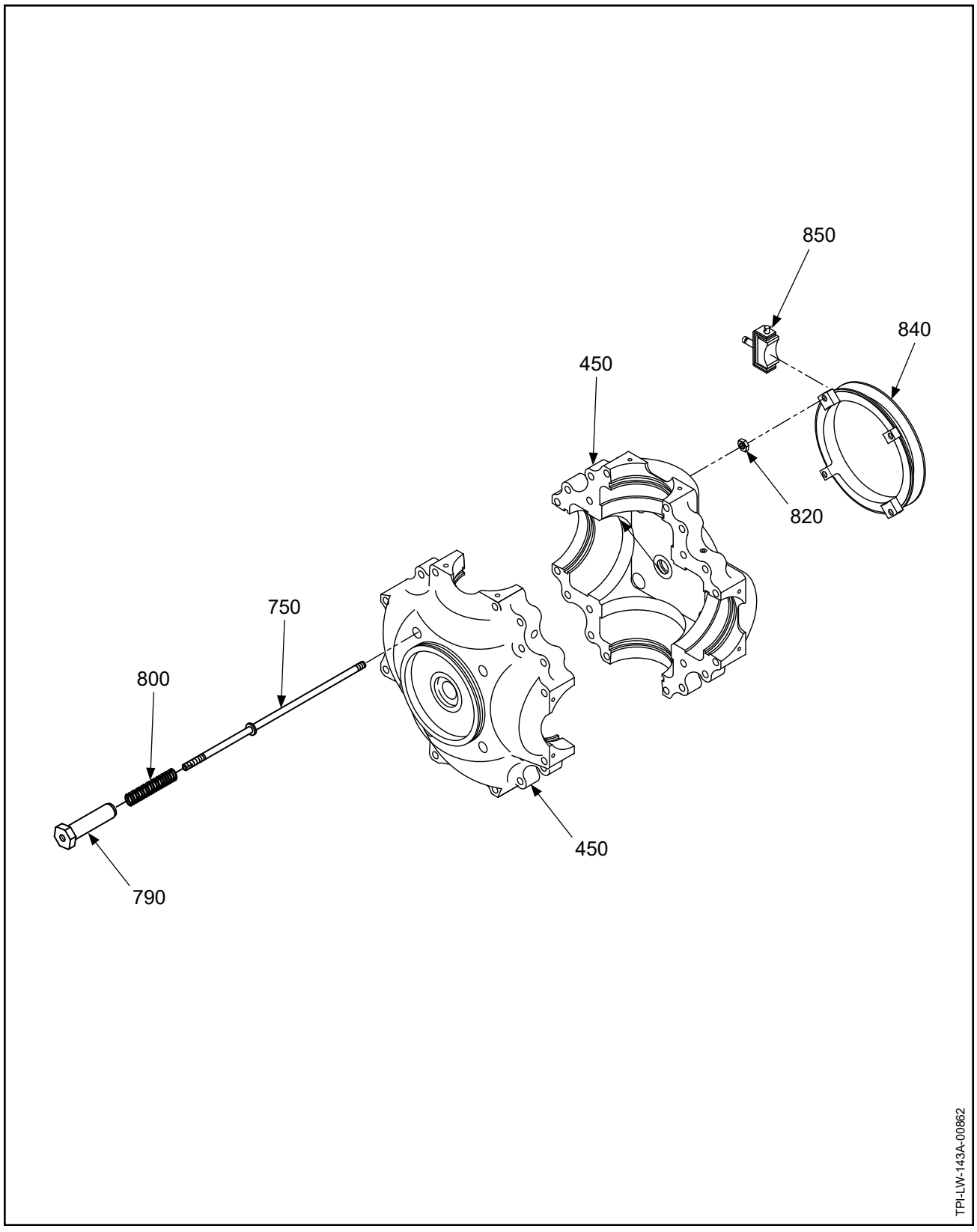
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E4A-3I, CONTINUED**				
		BALANCE PARTS				
-1110	A-80	• BOLT		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-239-2	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1150	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-9040		• COUNTERWEIGHT SLUGS				
-9041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-9042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

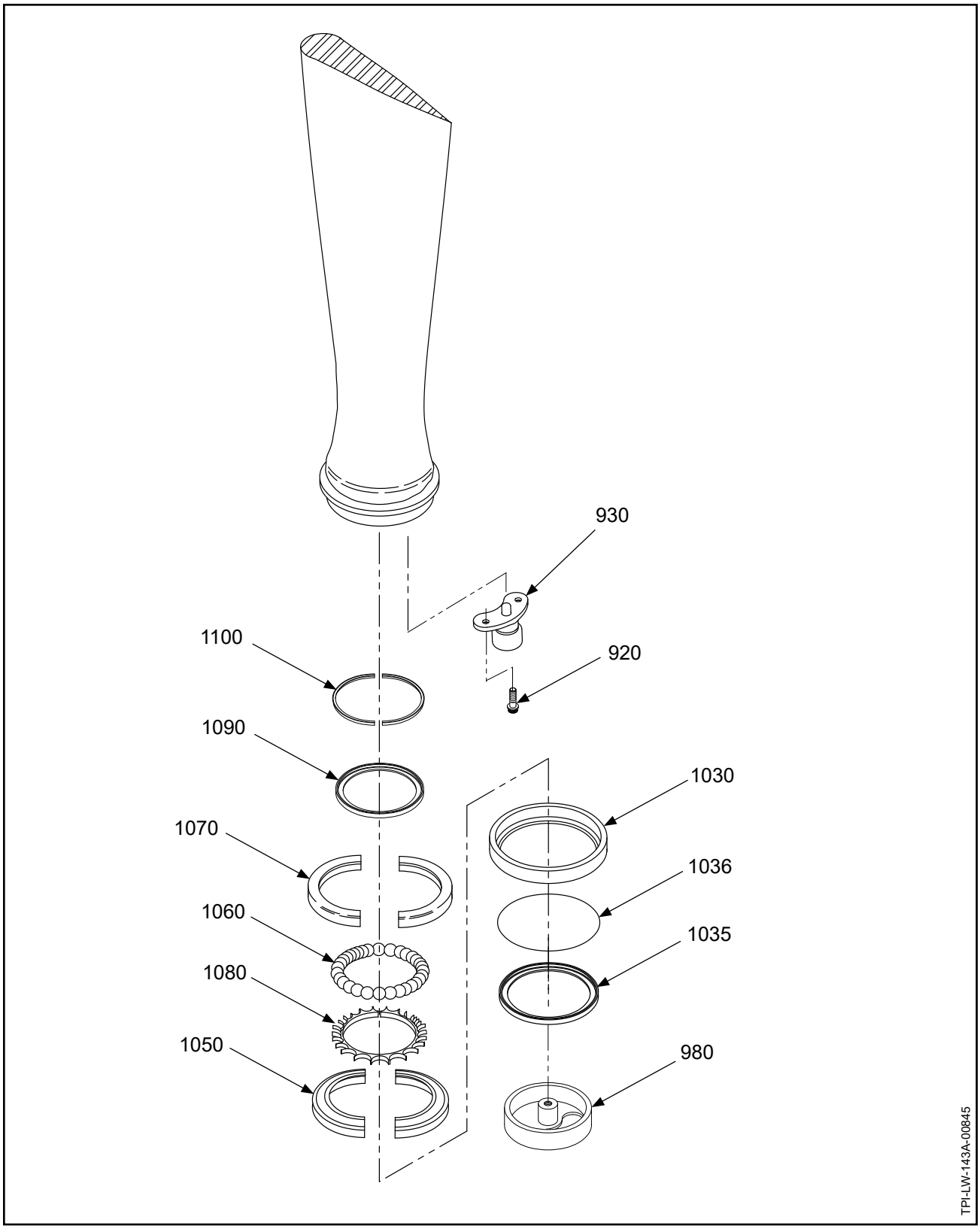
- ITEM NOT ILLUSTRATED



HC-E4A-3J: Propeller Parts
Figure 10-25



HC-E4A-3J: Beta System Parts
Figure 10-26



HC-E4A-3J: Blade Retention Parts
Figure 10-27

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E4A-3J**				
10	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
20	C-691	• BETA YOKE		1		
30	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430A		1		
80	C-3317-013	• O-RING (PITCH CHANGE ROD PLUG) NOT USED WITH ITEM 430A		1	Y	
90	D-6827	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
200	A-1683-2	• TAPPET BUSHING		2	Y	
210	C-1174-2	• YOKE TAPPET		2		
220	B-3829	• SCREW		4	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-2864	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
350	C-208	• • PISTON BUSHING		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430A		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430A		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430A		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		PROPELLER PARTS - HC-E4A-3J, CONTINUED				
430	D-6071-1	• PCP: ROD, PITCH CHANGE, SUPERSEDED BY ITEM 403A		1		PCP
430A	D-6506	• PCP: ROD, PITCH CHANGE, SUPERSEDES ITEM 430		1		PCP
440	C-3317-354	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	E-6826	• PCP: HUB UNIT, HC-E4A-3 (REFER TO “E-6826-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
610	B-7073-L1	• BOLT, 10-32, HEX HEAD, LIGHTNING		4	Y	
630	B-6265	• WIRE HARNESS BRACKET		4		
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-635	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-1	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680A	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680B	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680 AND 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3J, CONTINUED				
10-26		**BETA SYSTEM PARTS**				
750	B-671	• ROD, BETA		4		
790	B-2837	• SPRING TUBE		4		
800	B-668	• SPRING, COMPRESSION, BETA		4	Y	
820	B-3368	• NUT, 5/16-24, HEX, THIN		4	Y	
840	C-673	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3J, CONTINUED				
10-27		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3830	• TWELVE POINT BOLT		2	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-6257-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 (REFER TO "B-6257-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-6259	• PRELOAD PLATE ASSEMBLY, SUPERSEDES ITEM 980 REPLACED BY 980A (REFER TO "C-6259 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641-1	• PRELOAD PLATE ASSEMBLY, REPLACES ITEM 980, POST HC-SB-61-278 (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-6255	• PRELOAD PLATE, SUPERSEDED BY ITEM 980		1		
1030	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1030A		1		
1030A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1030		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792-1	• BEARING, RETENTION, BLADE SUPERSEDED BY ITEM 1040A REPLACED BY ITEM 1040A		1		
1050	C-792-1B	• • RACE, BLADE SIDE SUPERSEDED BY ITEM 1050A REPLACED BY ITEM 1050A		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-1-A	• • RACE, HUB SIDE SUPERSEDED BY ITEM 1070A REPLACED BY ITEM 1070A		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3J, CONTINUED				
10-27		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are per blade assembly.**				
-1040A	D-7745	• BEARING, RETENTION, BLADE SUPERSEDES ITEM 1040 REPLACES ITEM 1040, POST HC-SB-61-287		1		
1050A	D-7745-B	• • RACE, BLADE SIDE SUPERSEDES ITEM 1050 REPLACES ITEM 1050, POST HC-SB-61-287 SUPERSEDED BY ITEM 1050B		1		
1050B	D-7745-B	• • BLADE-SIDE BLADE BEARING RACE PART OF THE BLADE IPL, POST HC-SL-61-288		RF		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070A	D-7745-A	• • RACE, HUB SIDE SUPERSEDES ITEM 1070 REPLACES ITEM 1070, POST HC-SB-61-287		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-6337-1	• BLADE SEAL, USED WITH ITEM 1100 SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEMS 1090 AND 1100 POST HC-SL-61-303		1	Y	
1100	B-6376-3	• SEAL ENERGIZER RING, USED WITH ITEM 1090 SUPERSEDED BY ITEM 1090A		1	Y	

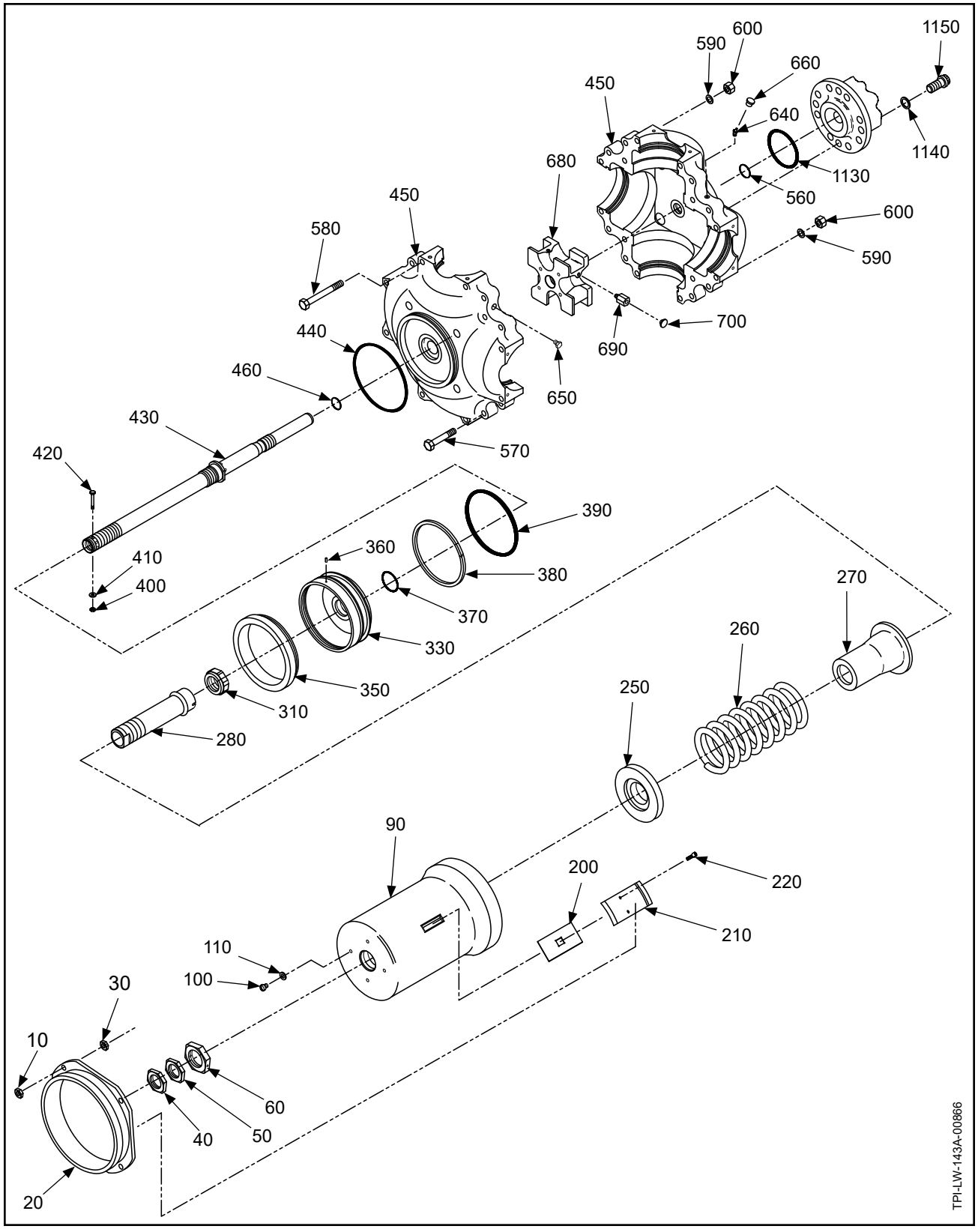
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

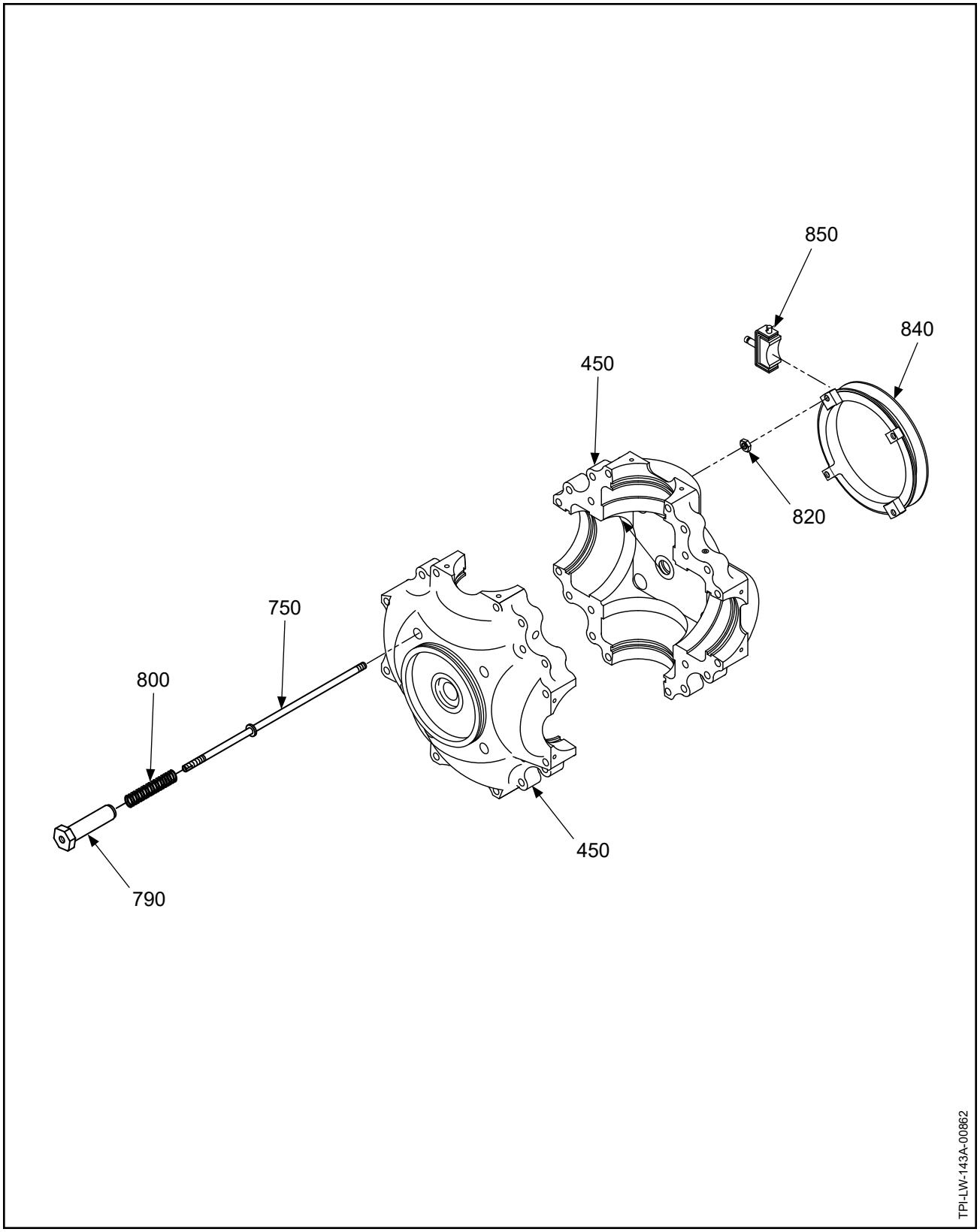
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E4A-3J, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• BOLT		AR	Y	
-1120	A-1305	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-239-2	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1150	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-9040		• COUNTERWEIGHT SLUGS				
-9041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-9042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

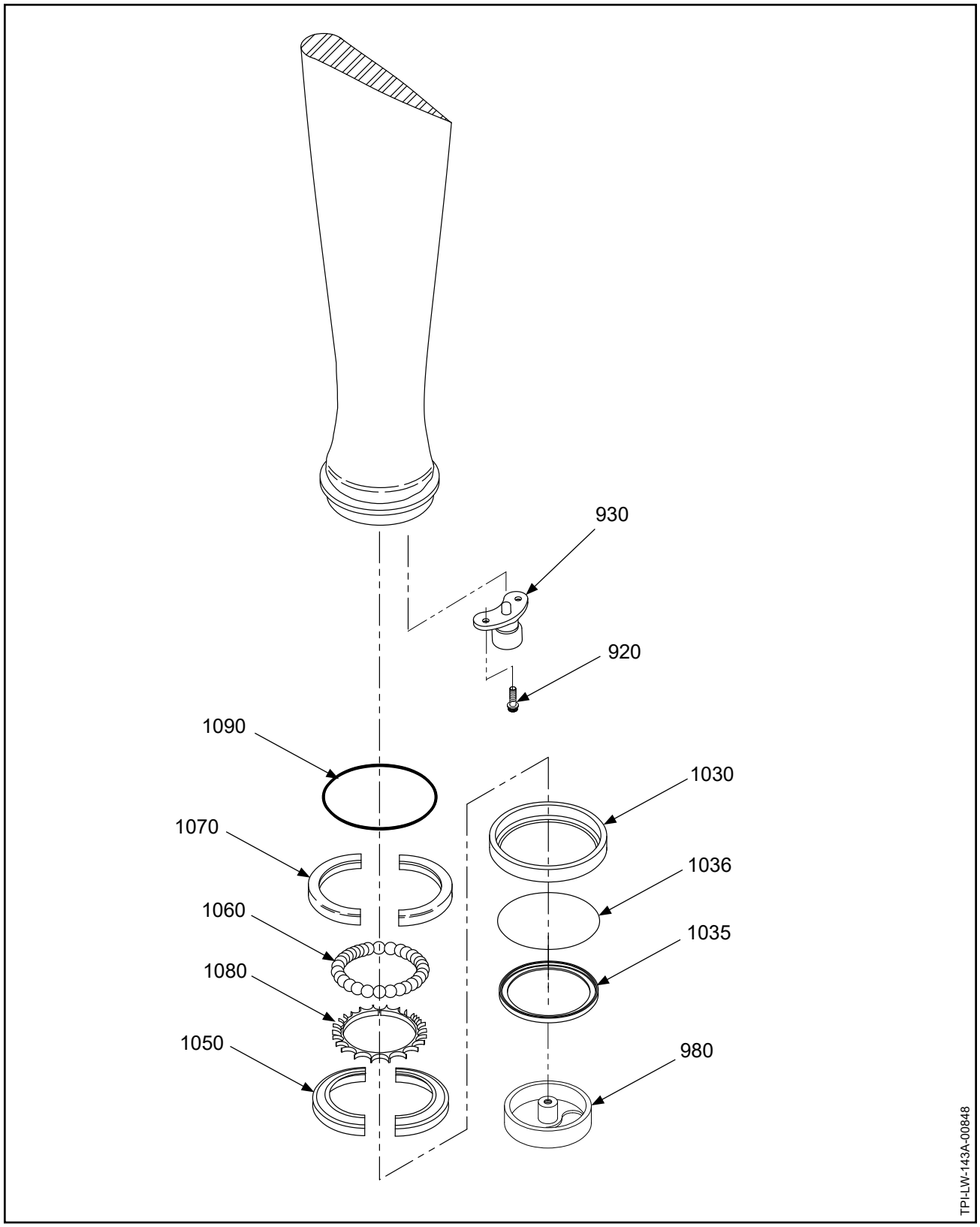
- ITEM NOT ILLUSTRATED



HC-E4A-3M: Propeller Parts
Figure 10-28



HC-E4A-3M: Beta System Parts
Figure 10-29



HC-E4A-3M: Blade Retention Parts
Figure 10-30

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-28		**PROPELLER PARTS - HC-E4A-3M**				
10	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
20	C-691	• BETA YOKE		1		
30	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-6827	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
200	A-1683-2	• TAPPET BUSHING		2	Y	
210	C-1174-2	• YOKE TAPPET		2		
220	B-3829	• SCREW, SUPERSEDES ITEM 220		4	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-2864-1	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
350	C-208-1	• • PISTON BUSHING		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-354	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-28		**PROPELLER PARTS - HC-E4A-3M, CONTINUED**				
450	E-6826	• PCP: HUB UNIT, HC-E4A-3 (REFER TO "E-6826 HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-635	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-1	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680A	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680B		1		
680B	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680 AND 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3M, CONTINUED				
10-29		**BETA SYSTEM PARTS**				
750	B-671-4	• BETA ROD		4		
790	B-2837	• SPRING TUBE		4		
800	B-668	• SPRING, COMPRESSION, BETA		4	Y	
820	B-3368	• NUT, 5/16-24, HEX, THIN		4	Y	
840	103825	• BETA RING - UNIT		1		
-845	103826	• • RING, INDICATOR, BETA SWITCH		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4A-3M, CONTINUED				
10-30		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO “100641-( ) PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• BLADE SEAL, OPTIONAL		1		
1036	C-3317-045	• O-RING		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)		1	Y	

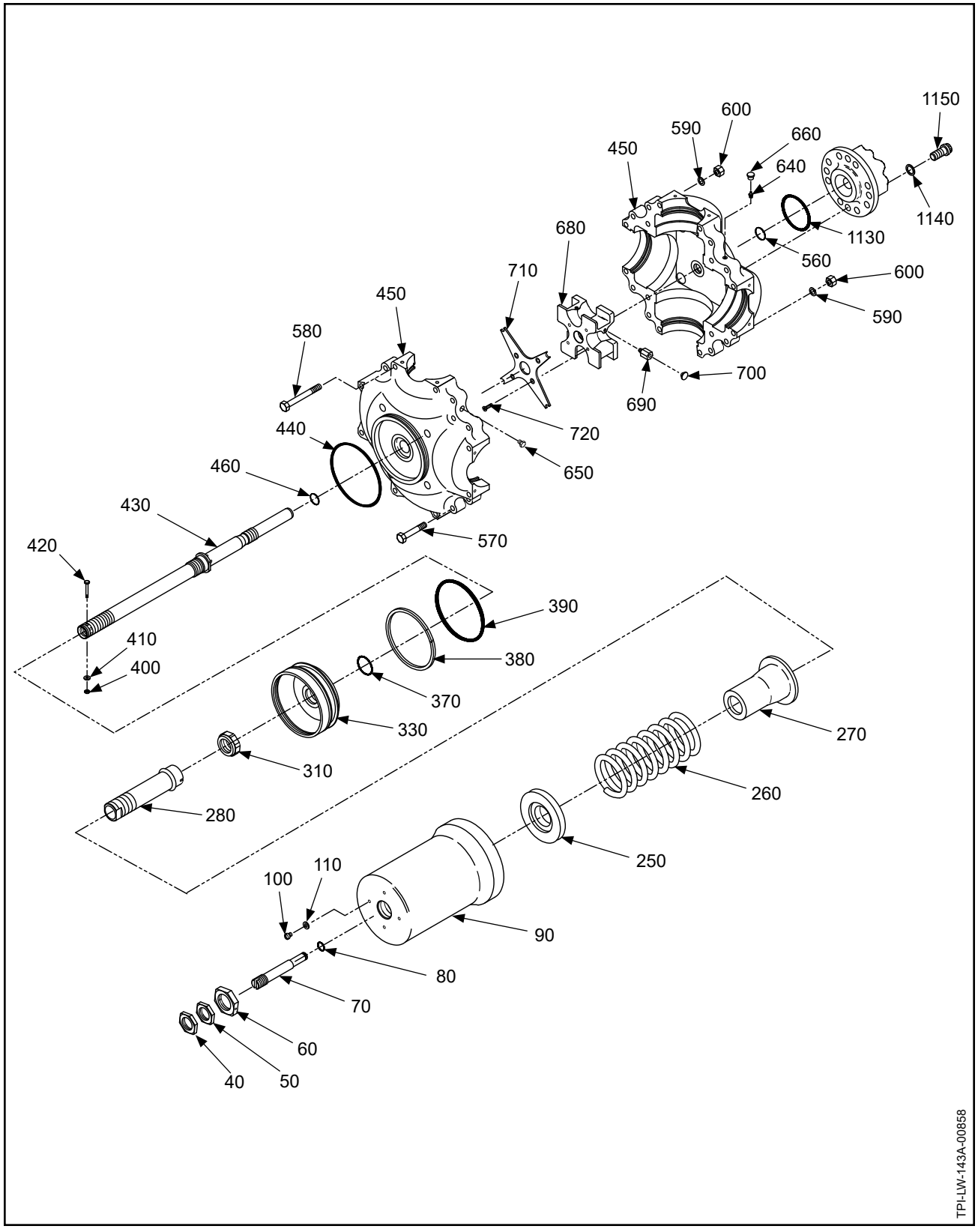
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

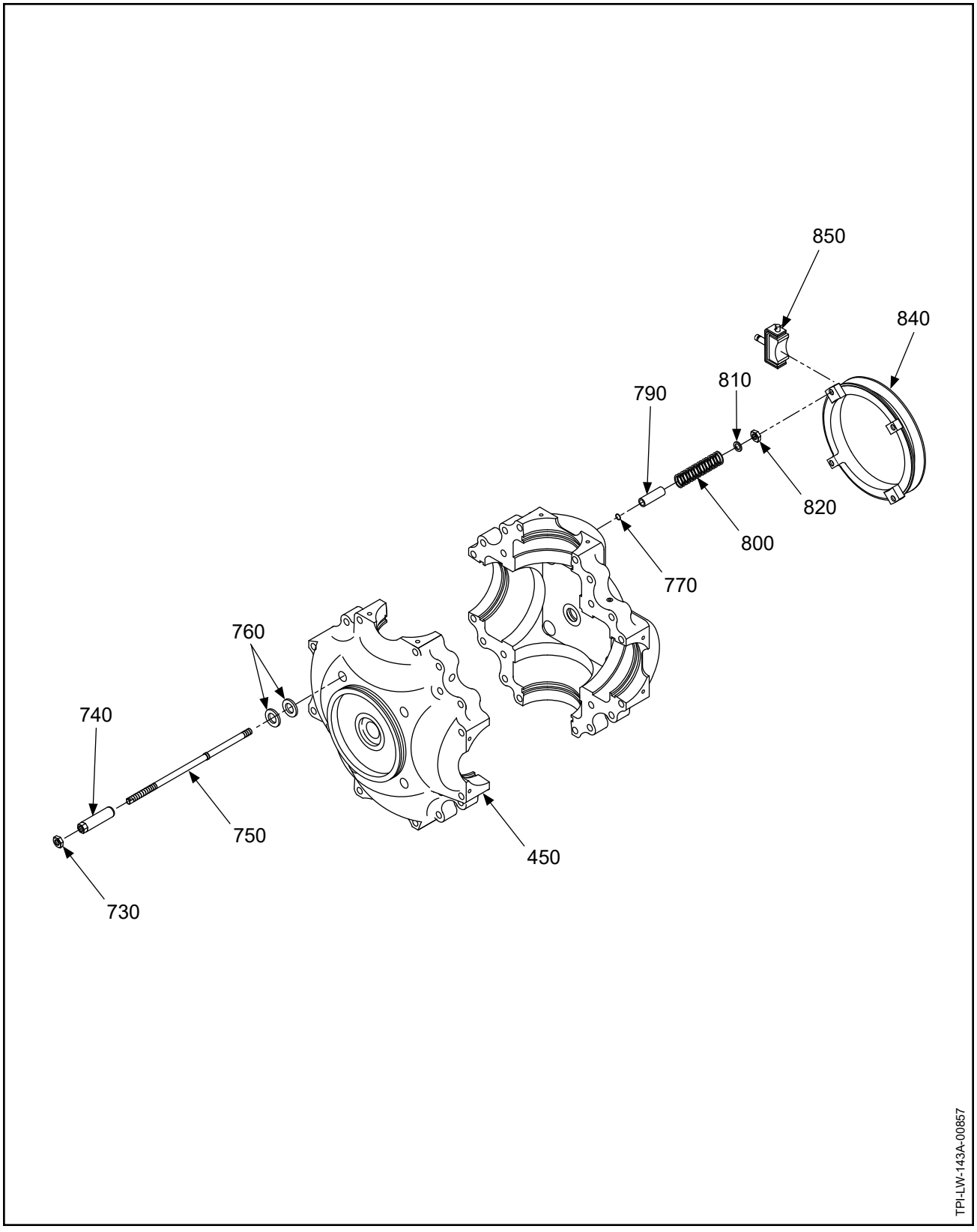
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-28		**PROPELLER PARTS - HC-E4A-3M, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		A/R	Y	
-1120	A-2424( )	• BALANCE WEIGHT		A/R		
		PROPELLER MOUNTING PARTS				
1130	C-3317-239-2	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1150	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

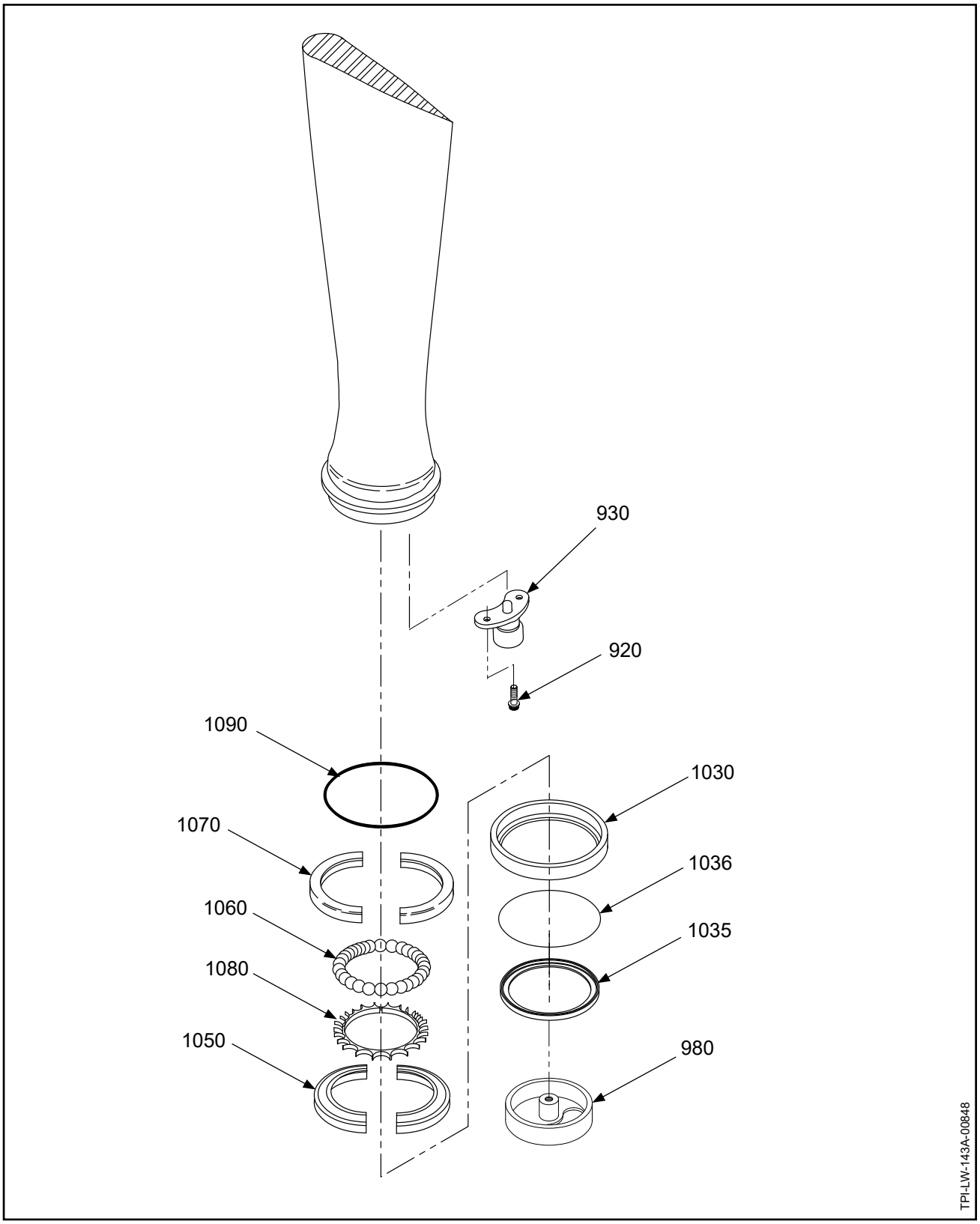
- ITEM NOT ILLUSTRATED



HC-E4N-3, -3I, -3Q: Propeller Parts
Figure 10-31



HC-E4N-3, -3I, -3Q: Beta System Parts
Figure 10-32



HC-E4N-3, -3I, -3Q: Blade Retention Parts
Figure 10-33

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-31		**PROPELLER PARTS - HC-E4N-3, -3I, 3Q**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD, ONLY USED WITH ITEMS 260A, 270A, AND 280A		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC, SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC, SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-31		**PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED**				
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE, SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-5126	• PCP: HUB, SUPERSEDED BY ITEM 450B		1		PCP
450A	D-5126-1	• PCP: HUB, ALTERNATE SUPERSEDED BY ITEM 450C		1		PCP
450B	D-5126-2	• PCP: HUB UNIT, HC-E4N-3, SUPERSEDES ITEM 450 (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450C	D-5126-3	• PCP: HUB UNIT, HC-E4N-3, ALTERNATE SUPERSEDES ITEM 450A (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-31		**PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED**				
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD, USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY, SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720A	B-6521-8	• • SCREW, 10-32, 100° HEAD, USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED				
10-32		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED				
10-33		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO "100028-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO "B-464-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO "108303-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	B-6209	• PRELOAD PLATE ASSEMBLY, SUPERSEDES ITEM 990, REPLACED BY 980A (REFER TO "C-6209 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641	• PRELOAD PLATE ASSEMBLY, REPLACES ITEM 980 POST HC-SB-61-289 (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
-990	C-6172	• PRELOAD PLATE, SUPERSEDED BY ITEM 980		1		
1000	A-1272	• • RACE, INNER, BEARING		1		
1010	A-3204	• • SCREW, SET, 5/16-24, REPLACED BY ITEM 1010A		1	Y	
1010A	A-3204-2	• • SCREW, SET, 5/16-24, REPLACES ITEM 1010		1	Y	
1020	B-3368	• • NUT, 5/16-24, HEX, THIN		1	Y	
1030	B-1041	• RING, RETAINING, BEARING, SUPERSEDED BY ITEM 1030A		1		
1030A	B-7071	• RING, RETAINING, BEARING, SUPERSEDES ITEM 1030		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED				
10-33		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are per blade assembly.**				
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING), SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

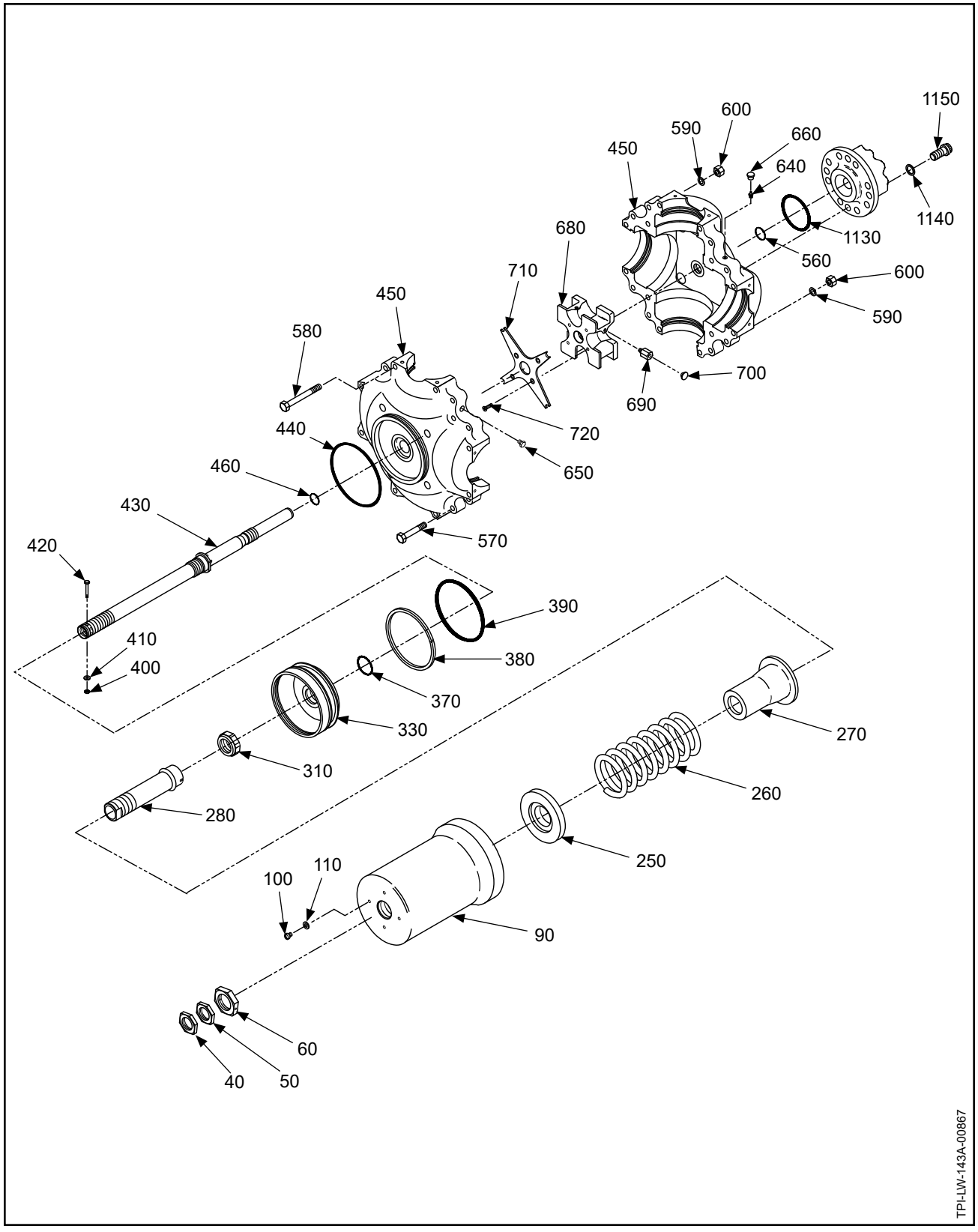
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

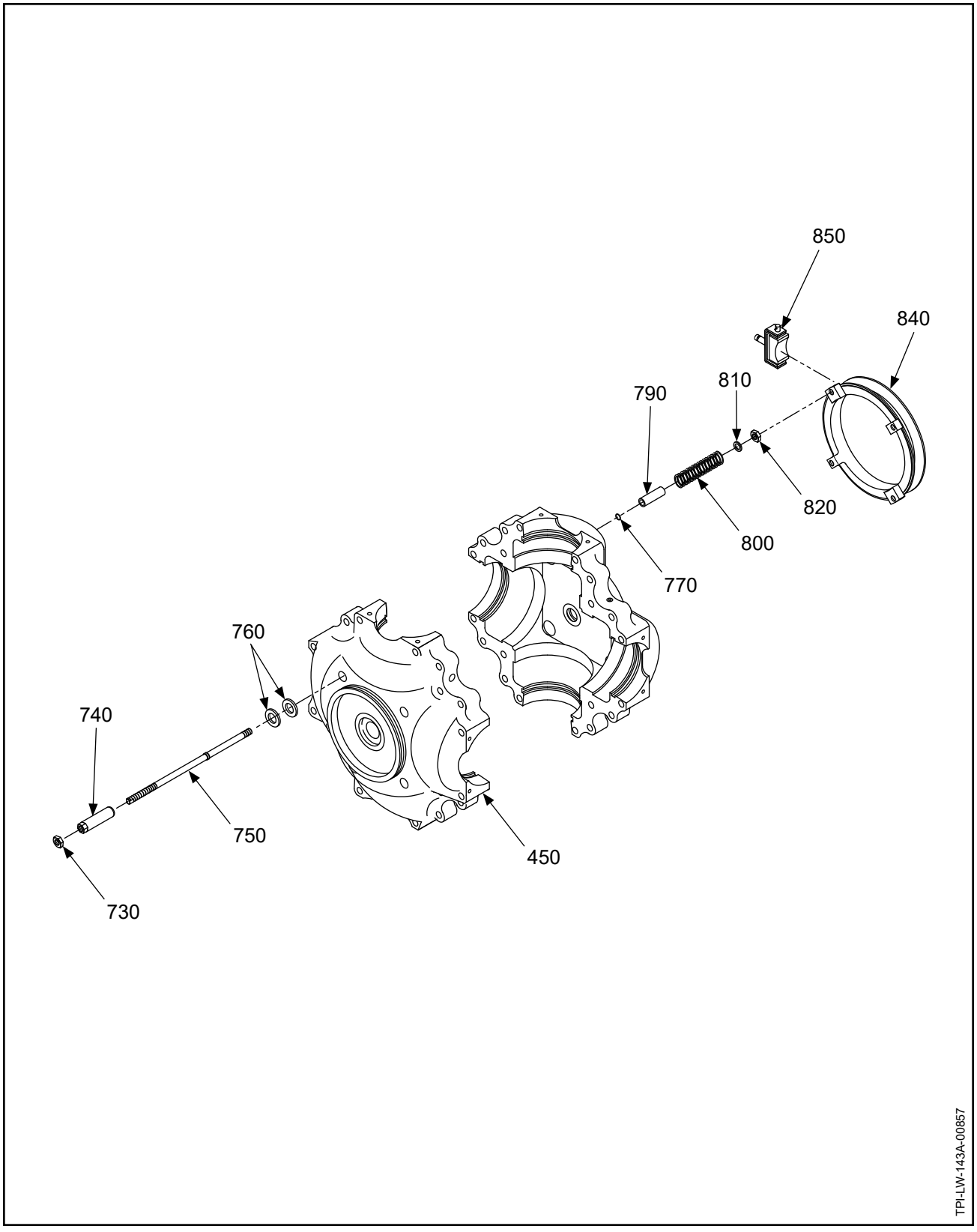
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-31		**PROPELLER PARTS - HC-E4N-3, -3I, 3Q, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

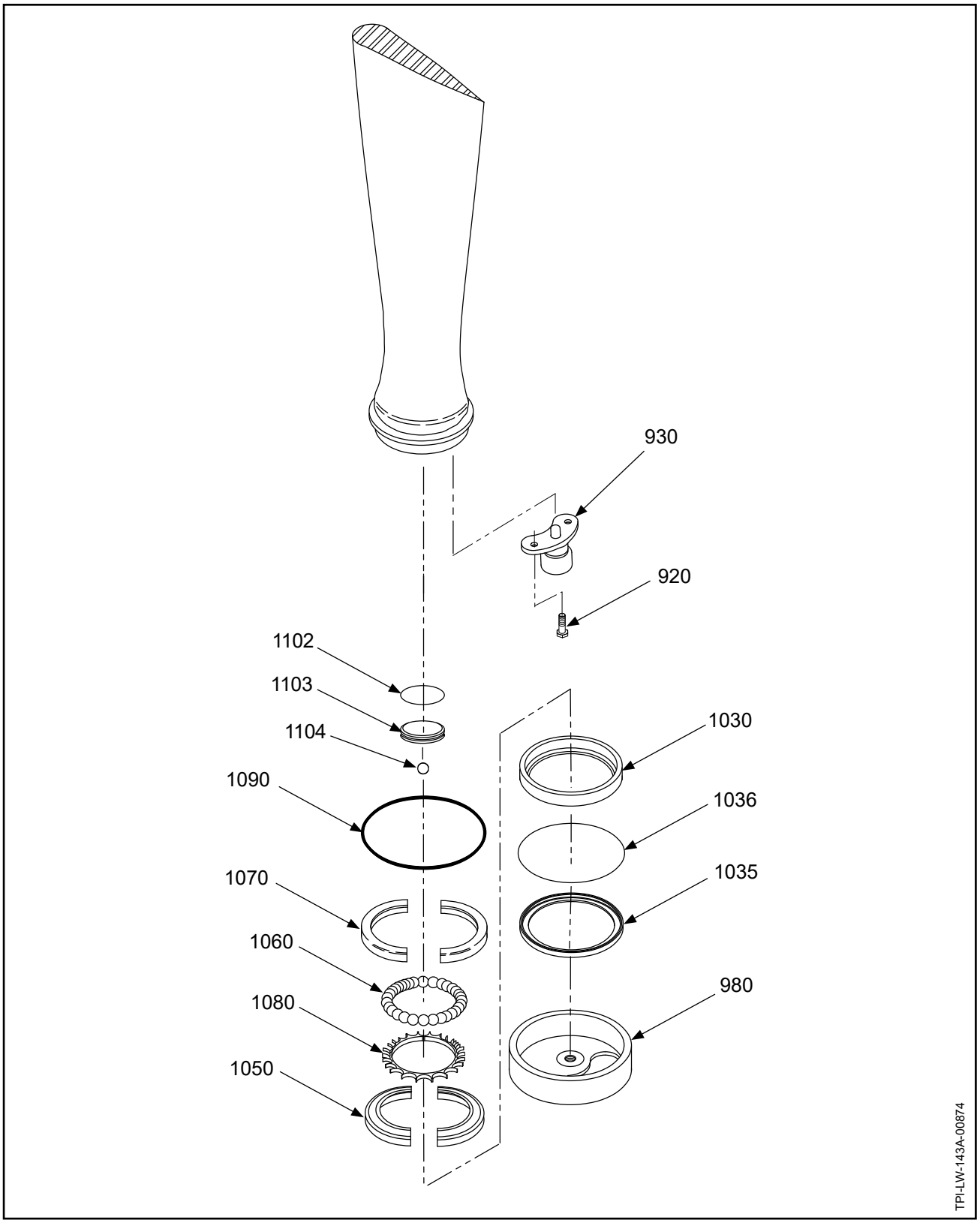
- ITEM NOT ILLUSTRATED



HC-E4N-3A: Propeller Parts
Figure 10-34



HC-E4N-3A: Beta System Parts
Figure 10-35



HC-E4N-3A: Blade Retention Parts
Figure 10-36

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-34		**PROPELLER PARTS - HC-E4N-3A**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD				
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-5126-5	• PCP: HUB UNIT, HC-E4N-3A (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-34		**PROPELLER PARTS - HC-E4N-3A, CONTINUED**				
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	103614	• FORK, FOUR BLADE - ASSEMBLY		1		
680	103548	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	103650	• • PLATE, BETA PICKUP		4		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3A, CONTINUED				
10-35		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3A, CONTINUED				
10-36		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3385-3H	• BOLT, 5/16-24, HEX HEAD		2	Y	
-925	102632	• TUBING, SILICONE		1	Y	
930	103545-2	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “103545-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	103525	• PRELOAD PLATE ASSEMBLY (REFER TO “103525 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	101512	• RING, BEARING, RETAINING		1		
1035	101437	• SEAL, BLADE		1		
1036	C-3317-045	• O-RING		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)		1	Y	
1102	C-3317-028	• O-RING (BLADE PLUG)		1	Y	
1103	103413	• PLUG, BLADE		1		
1104	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		1	Y	

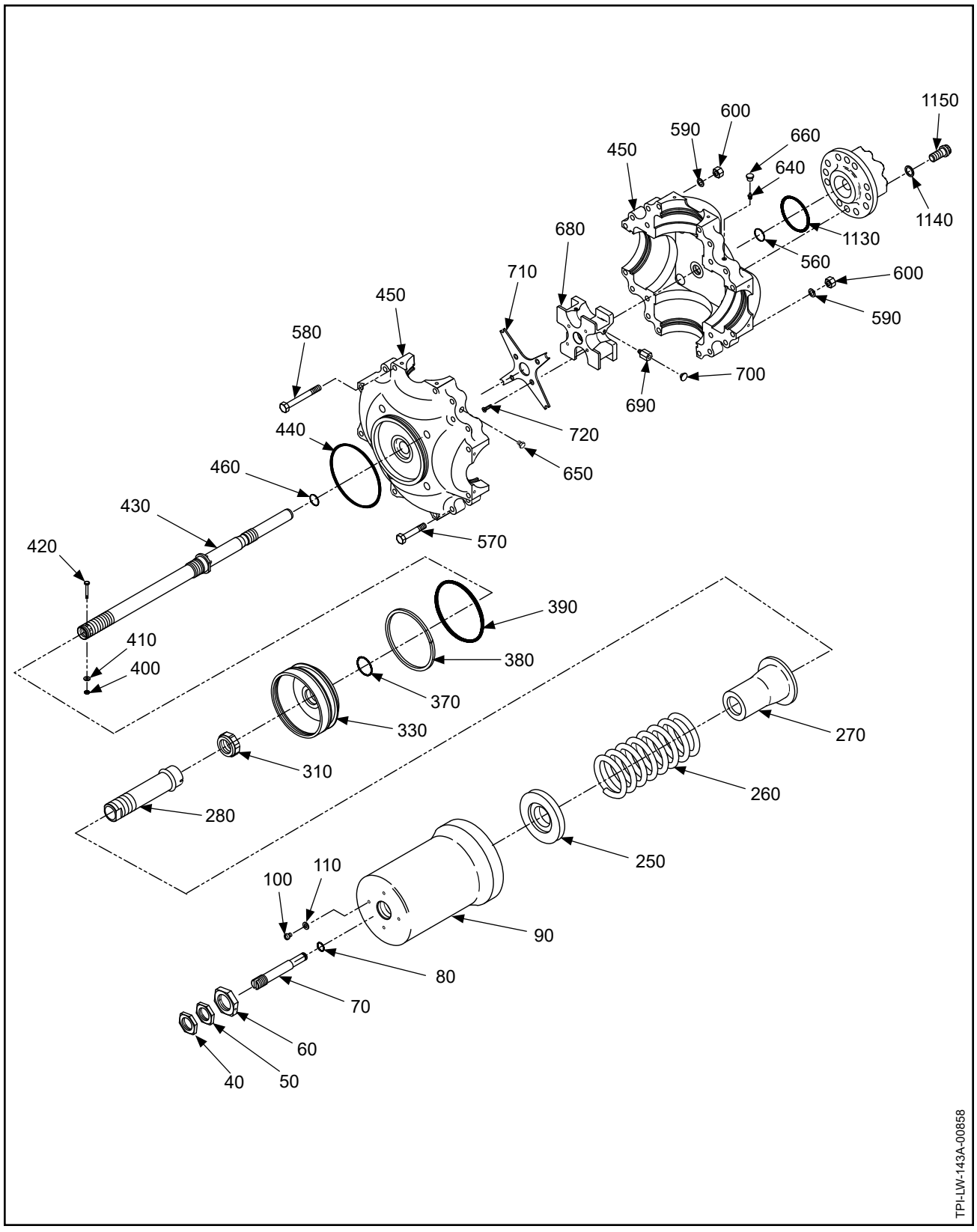
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

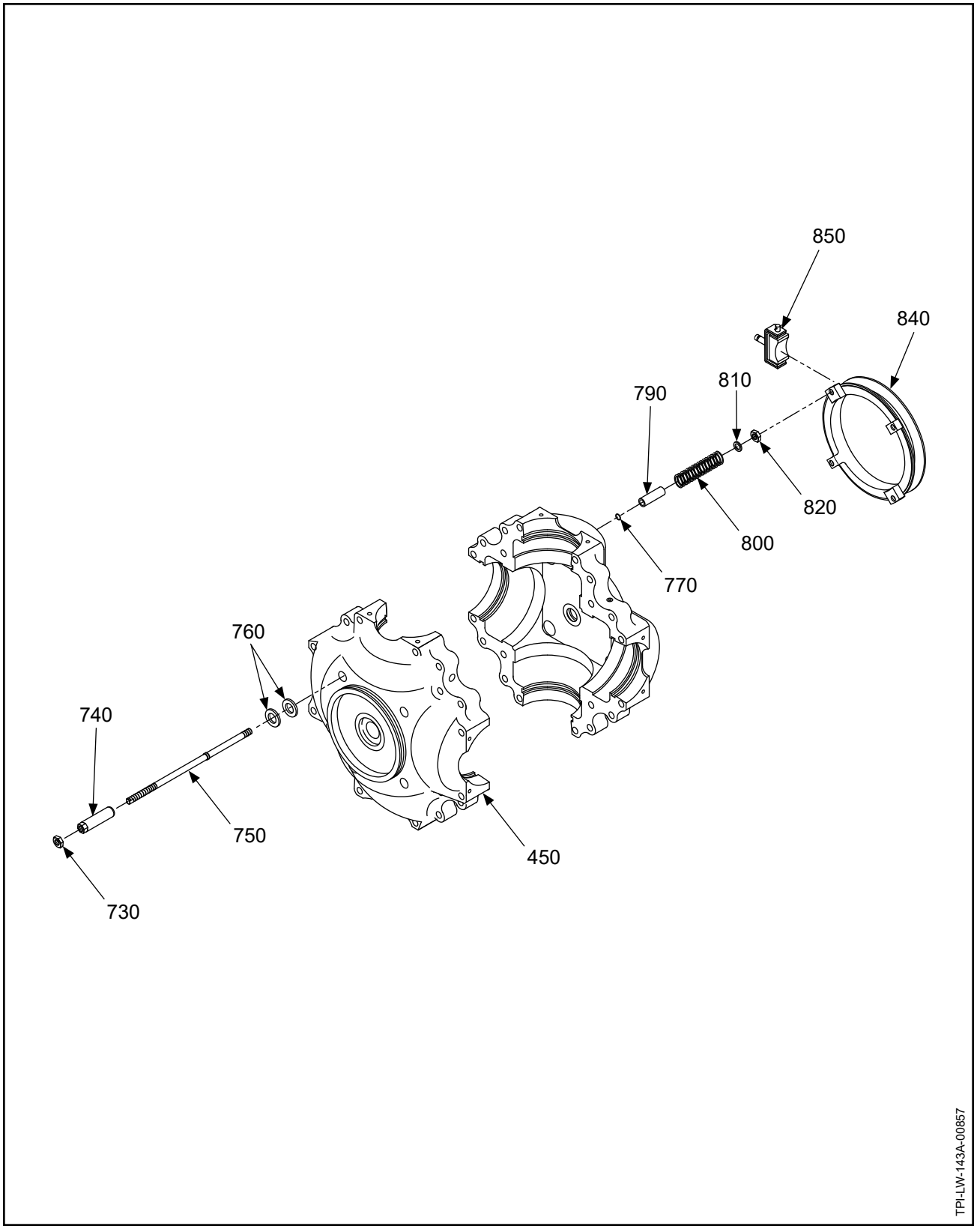
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-34		**PROPELLER PARTS - HC-E4N-3A, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT (HUB ATTACHMENT)		AR		
-1125	102578	• BALANCE WEIGHT (BLADE ATTACHMENT)		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

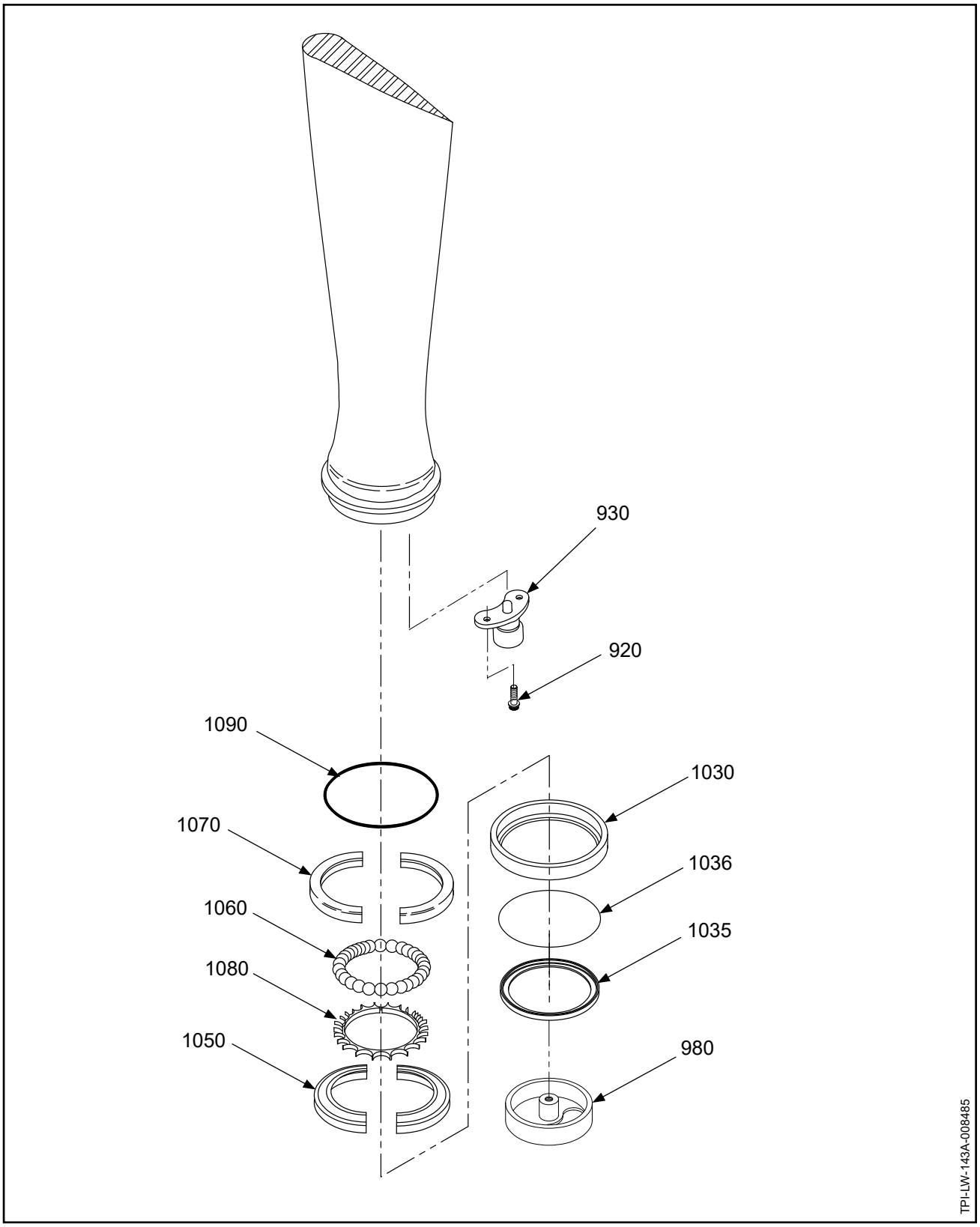
- ITEM NOT ILLUSTRATED



HC-E4N-3G, 3H, -3J, -3P: Propeller Parts
Figure 10-37



HC-E4N-3G, -3H, -3J, -3P: Beta System Parts
Figure 10-38



HC-E4N-3G, -3H, -3J, -3P: Blade Retention Parts
Figure 10-39

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-37		**PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3PP**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 290		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-37		**PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3P, CONTINUED**				
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-5126-2	• PCP:HUB UNIT, HC-E4N-3, ALTERNATE (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-5126-3	• PCP:HUB UNIT, HC-E4N-3 (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• SELF-LOCKING HEX3/8-24 NUT		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-37		**PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3P, CONTINUED**				
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE, SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690A	B-468	• • EXTENSION, BUMPER		4		
700A	A-3256	• • BUMPER, FORK		4	Y	
710A	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720A	B-6521-8	• • SCREW, 10-32, 100° HEAD USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3P, CONTINUED				
10-38		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3P, CONTINUED				
10-39		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are <u>per blade assembly</u>.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY, REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING, POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030, USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	

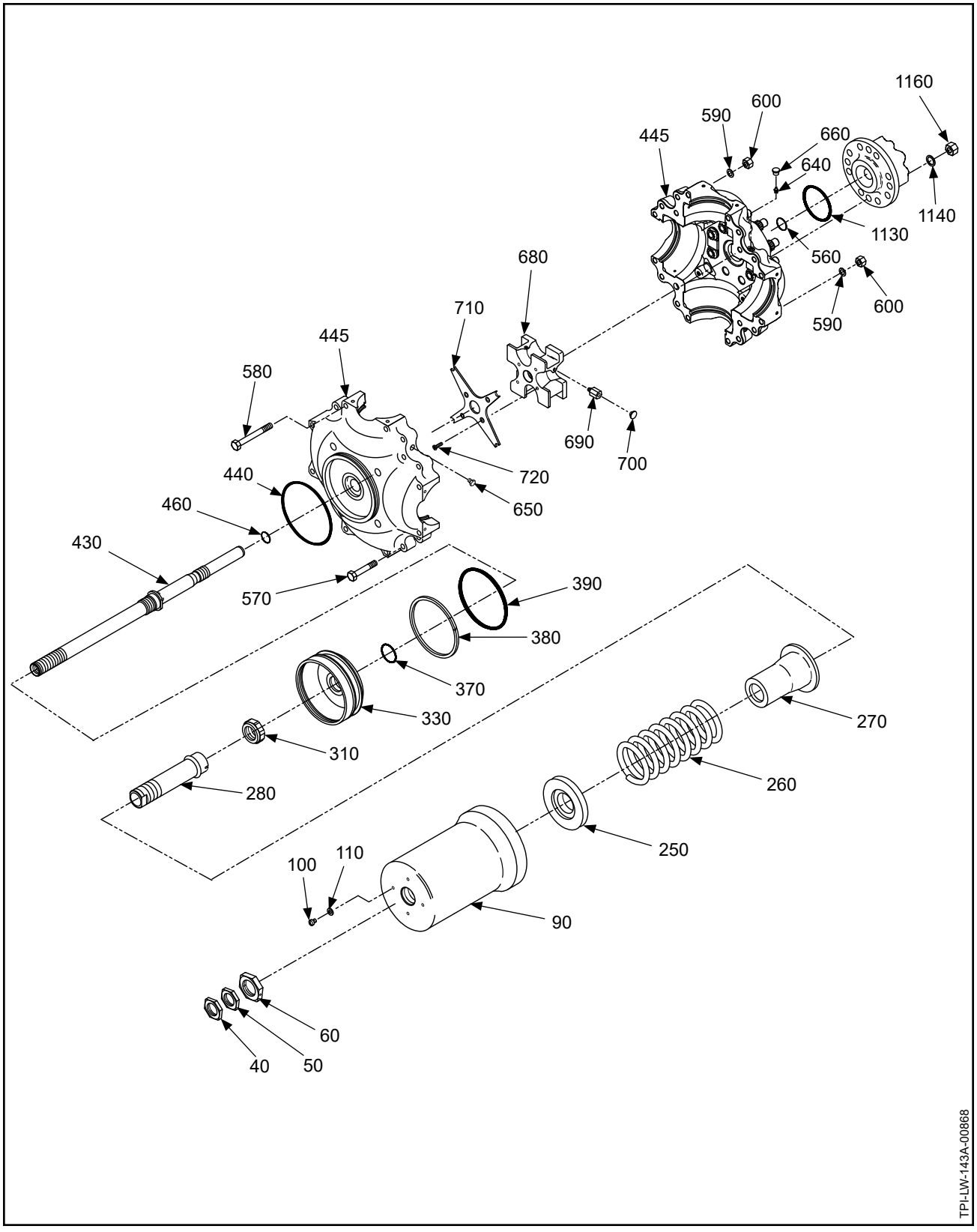
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

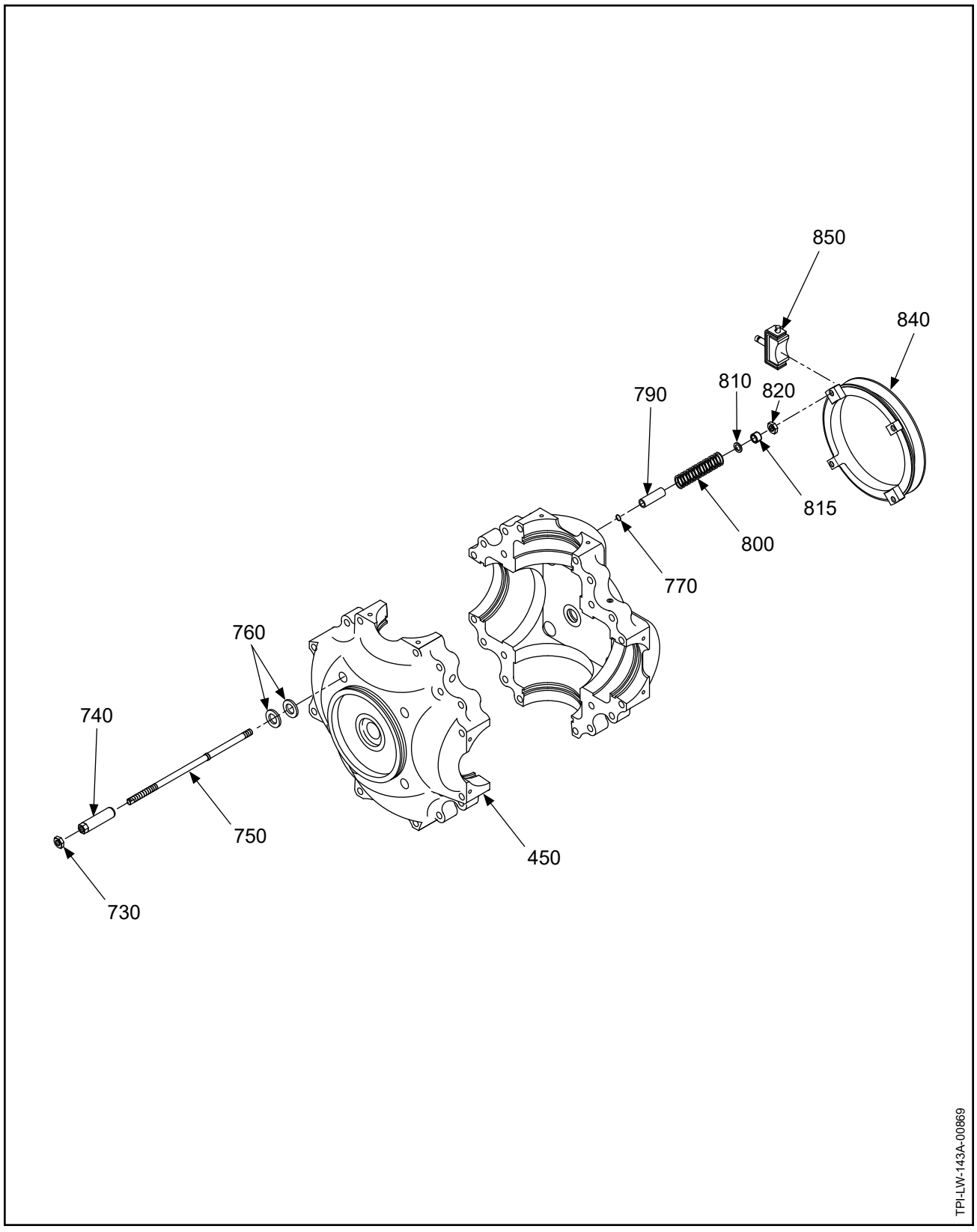
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-37		**PROPELLER PARTS - HC-E4N-3G, -3H, -3J, -3P, CONTINUED**				
1090	C-3317-340	• O-RING (BLADE MOUNTING), SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

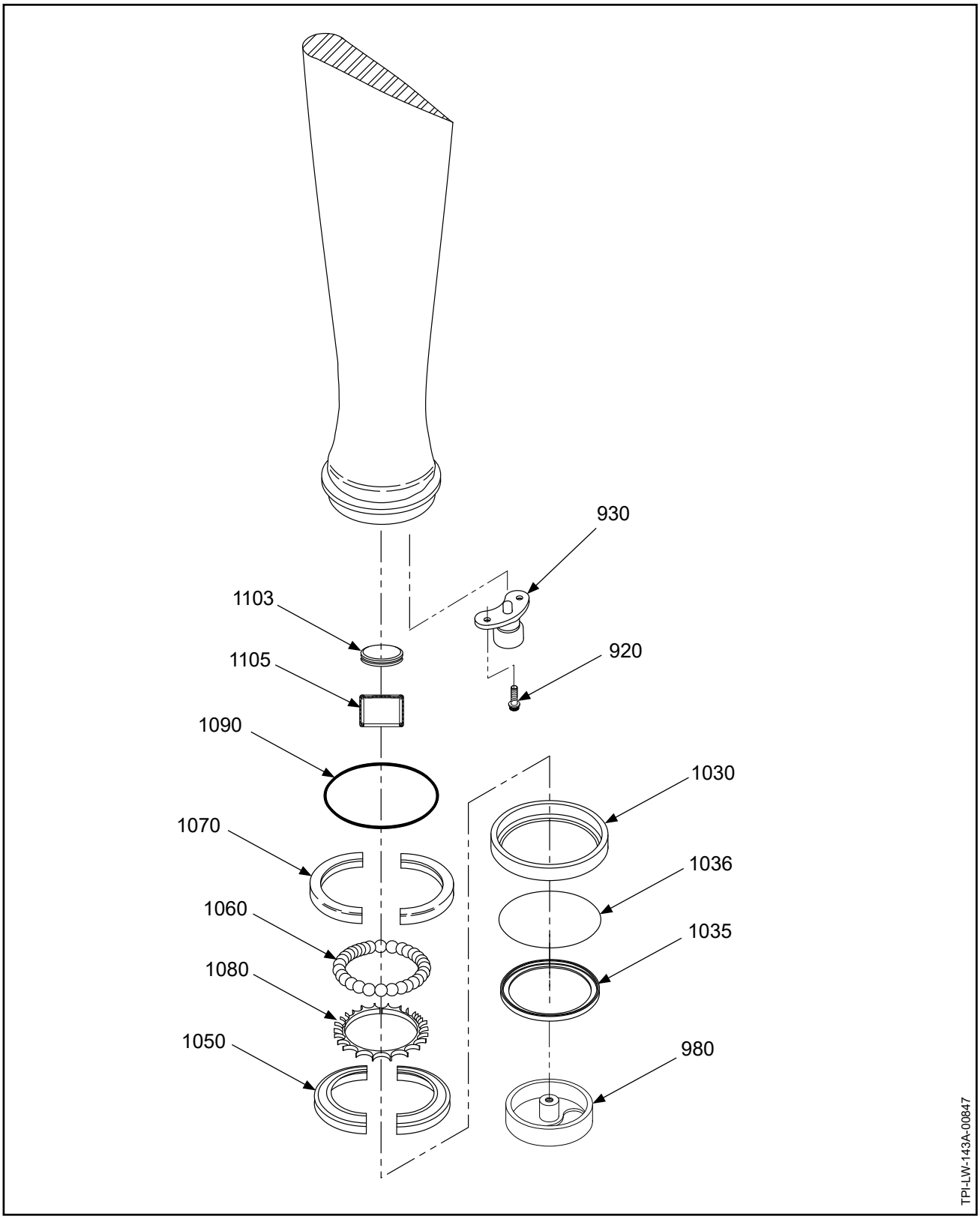
- ITEM NOT ILLUSTRATED



HC-E4N-3KA: Propeller Parts
Figure 10-40



HC-E4N-3KA: Beta System Parts
Figure 10-41



HC-E4N-3KA: Blade Retention Parts
Figure 10-42

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-40		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KA**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
-445	107222	• PCP: HUB - ASSEMBLY, HC-E4(N,P,W)-3K (REFER TO “107222 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450	107210	• • PCP: HUB UNIT, HC-E4(N,P,W)-3K		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	C-6349	• FITTING, LUBRICATION, 45° (ENGINE-SIDE OF HUB)		2	Y	
650	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		2	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-40		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KA, CONTINUED**				
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3KA, CONTINUED				
10-41		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		1		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	107255	• RING, BETA		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3KA, CONTINUED				
10-42		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• SEAL, BLADE, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	
1103	A-665	• PLUG, BLADE		1		
1105	A-1271	• BEARING, NEEDLE, CLOSED END		1	Y	

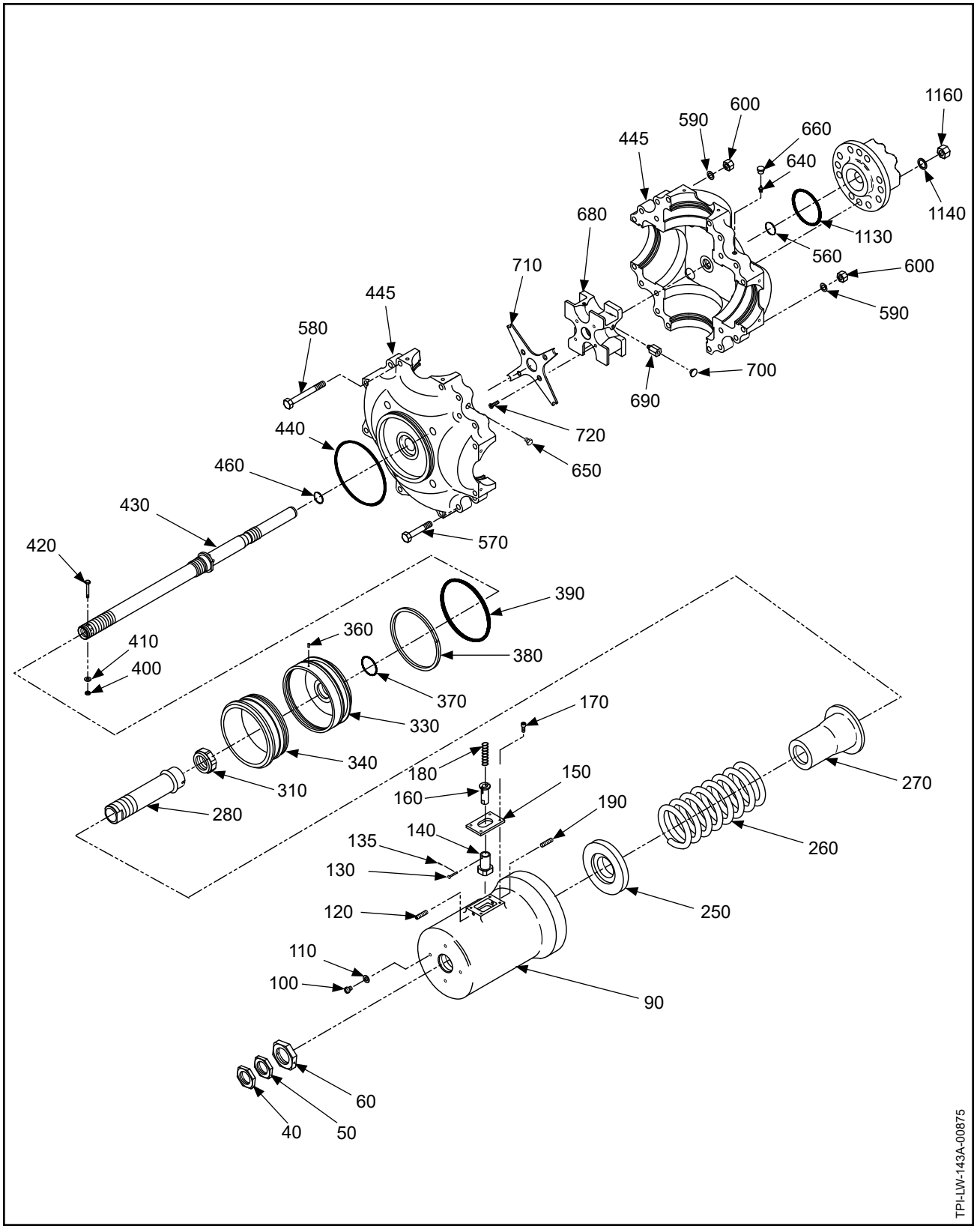
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL PROPELLER INC. ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

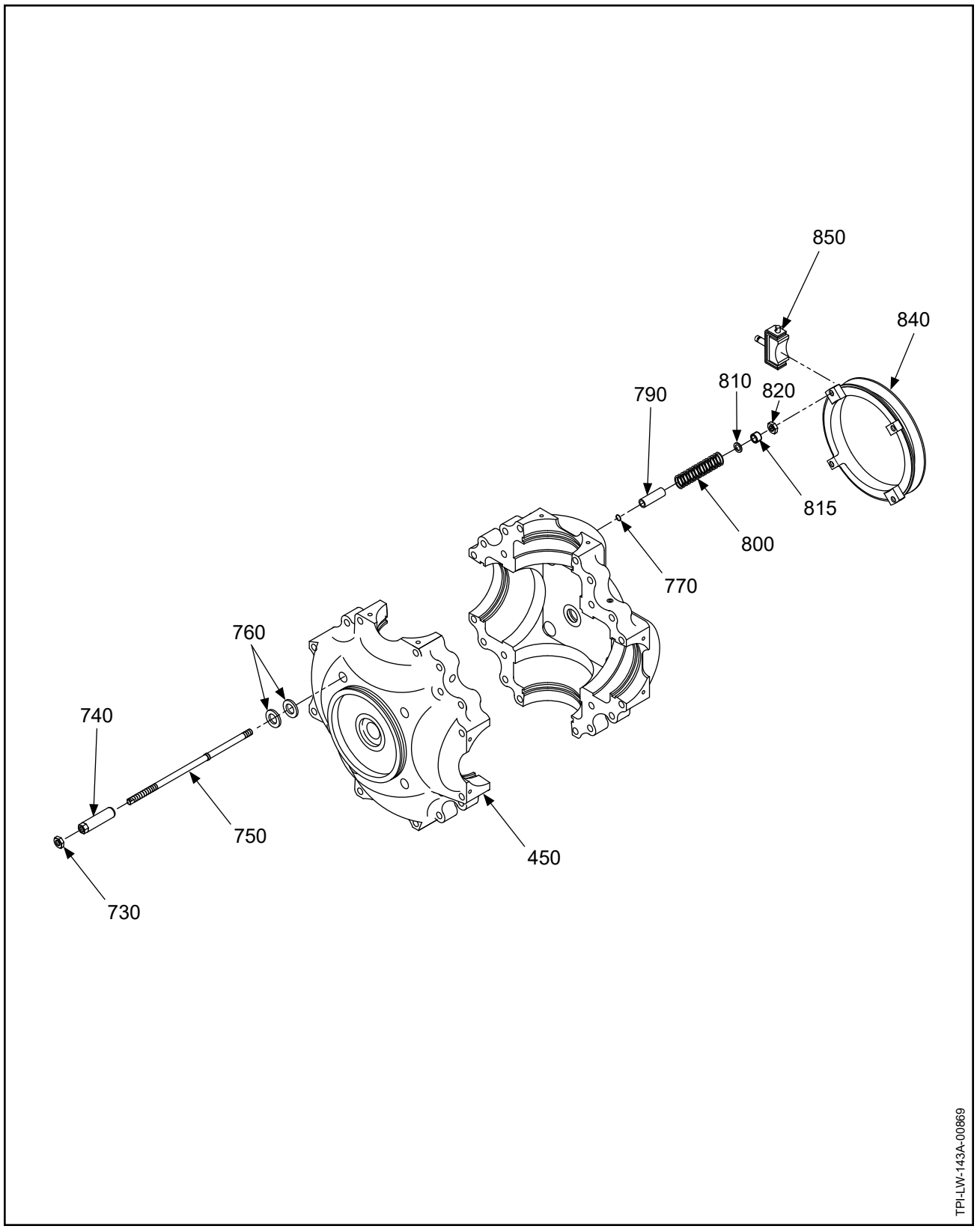
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-40		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KA, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

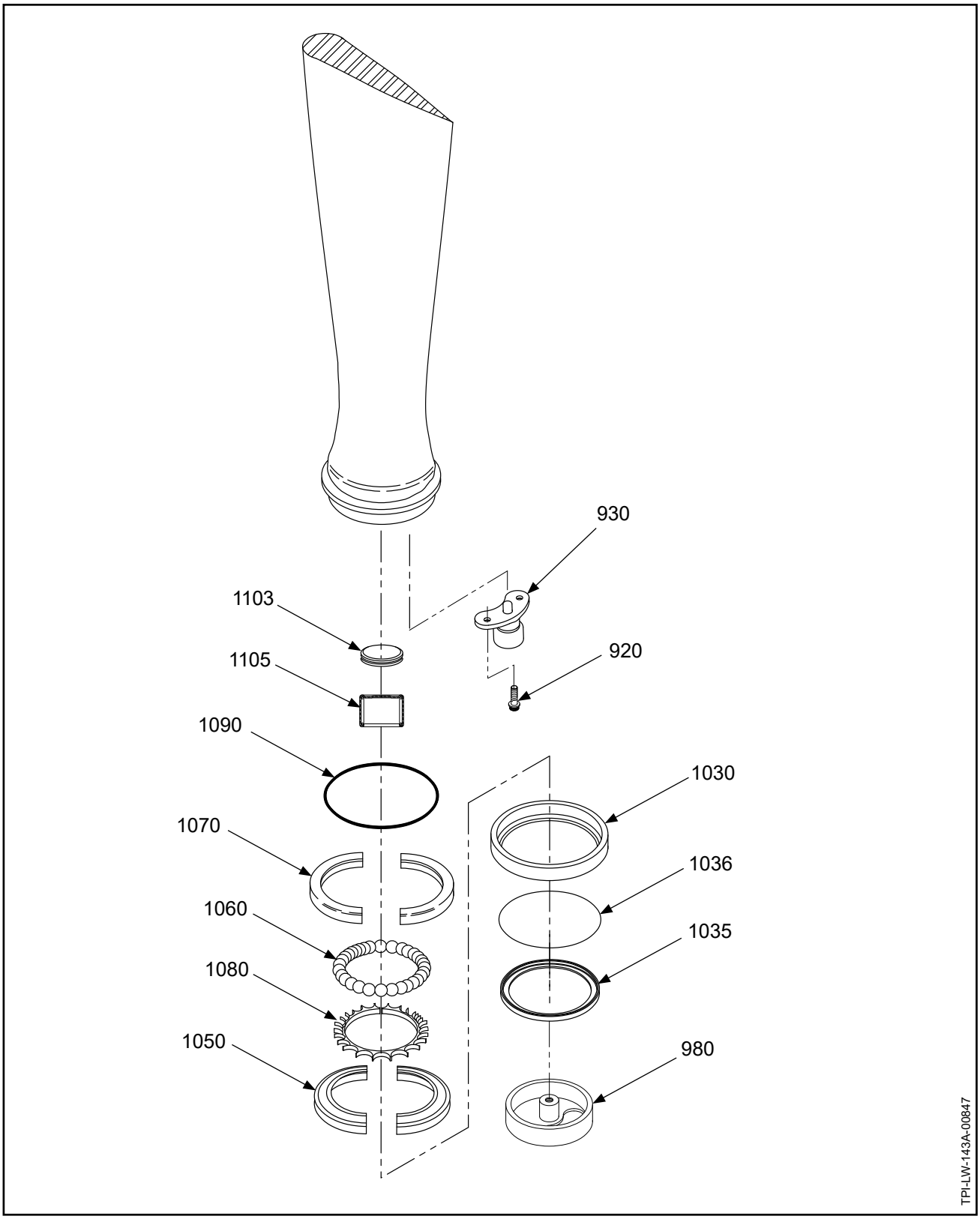
- ITEM NOT ILLUSTRATED



HC-E4N-3KAY: Propeller Parts
Figure 10-43



HC-E4N-3KAY: Beta System Parts
Figure 10-44



HC-E4N-3KAY: Blade Retention Parts
Figure 10-45

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-43		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KAY**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-484	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
120	B-6639-131	• SCREW, SET		2	Y	
130	B-2877	• CLEVIS PIN, 3/32		2	Y	
135	B-3838-1	• COTTER PIN		2	Y	
140	B-444-4	• HOUSING, START LOCK		2		
150	B-446	• COVER, HOUSING, START LOCK		2		
160	A-2620-1	• PIN, START LOCK		2		
170	B-3821	• SCREW, 10-32, CAP		8	Y	
180	B-658	• SPRING, COMPRESSION, START LOCK		2	Y	
190	B-6639-131	• SCREW, SET		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-497-3	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
340	B-493-3	• • RING, PISTON, START LOCK		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-43		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KAY, CONTINUED**				
-445	107222	• PCP: HUB - ASSEMBLY, HC-E4(N,P,W)-3K (REFER TO "107222 HUB ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	C-6349	• FITTING, LUBRICATION, 45° (ENGINE-SIDE OF HUB)		4	Y	
650	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3KAY, CONTINUED				
10-44		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		4		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	107255	• RING, BETA		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3KAY, CONTINUED				
10-45		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• SEAL, BLADE, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	
1103	A-665	• PLUG, BLADE		1		
1105	A-1271	• BEARING, NEEDLE, CLOSED END		1	Y	

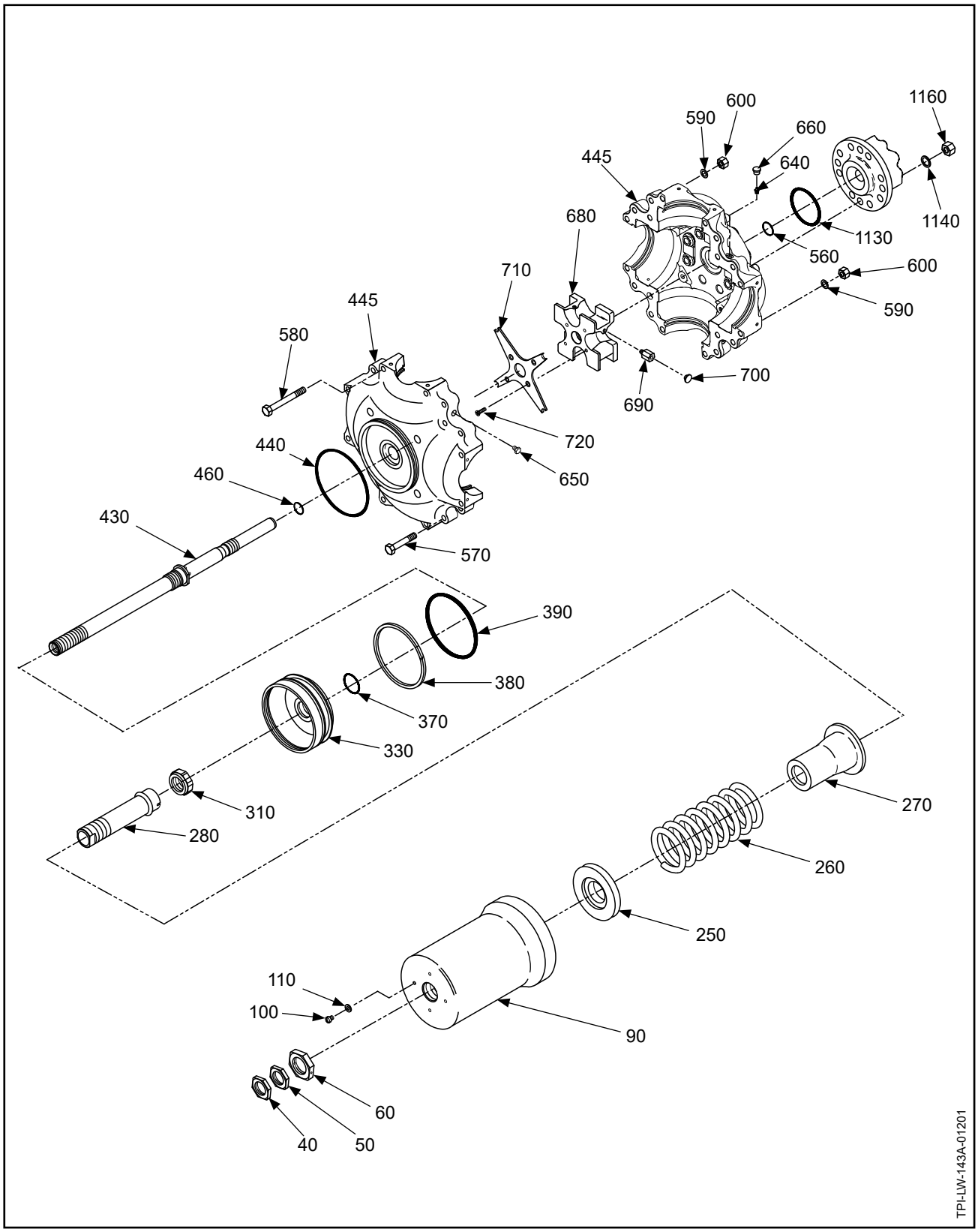
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL PROPELLER INC. ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

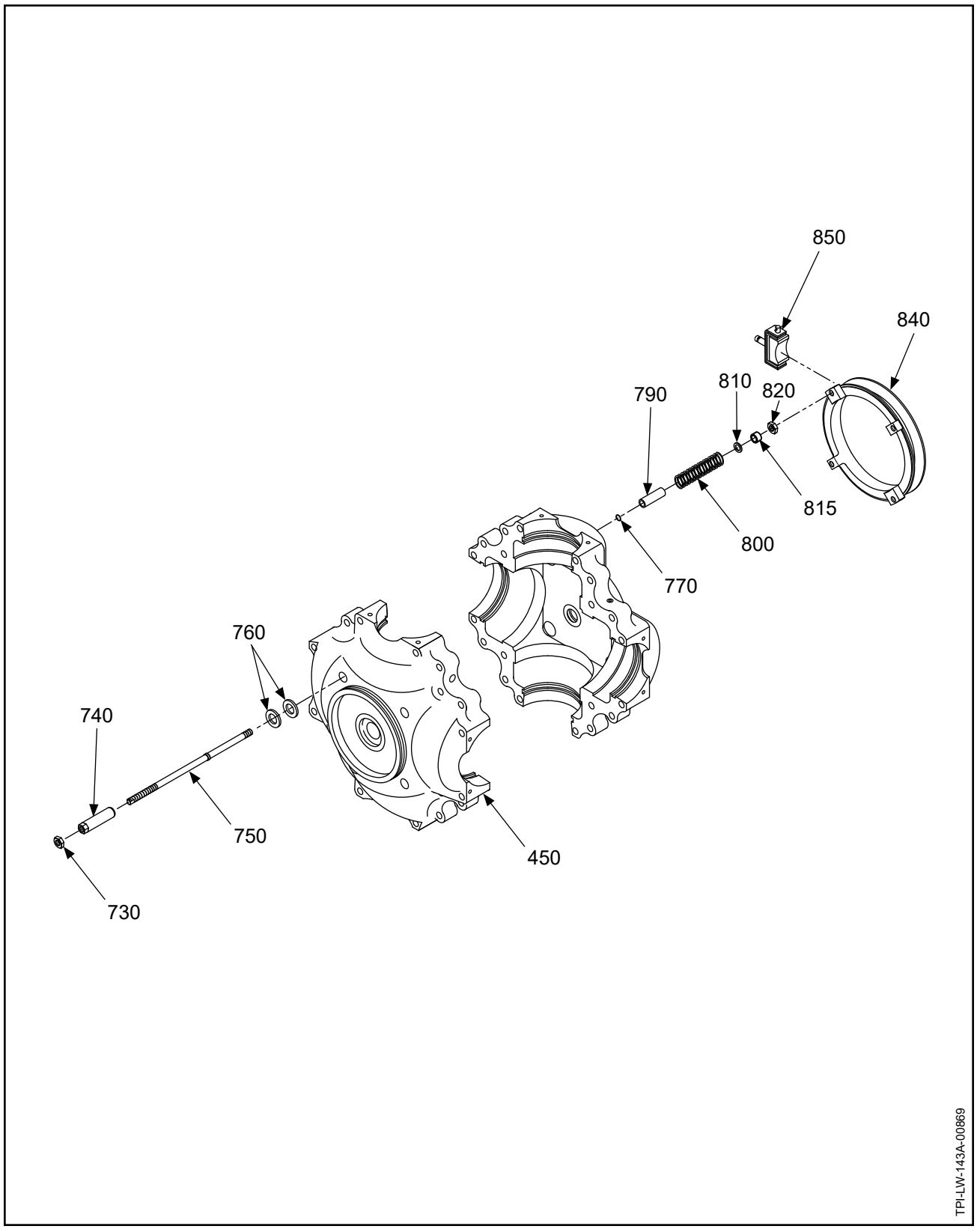
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-43		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KAY, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

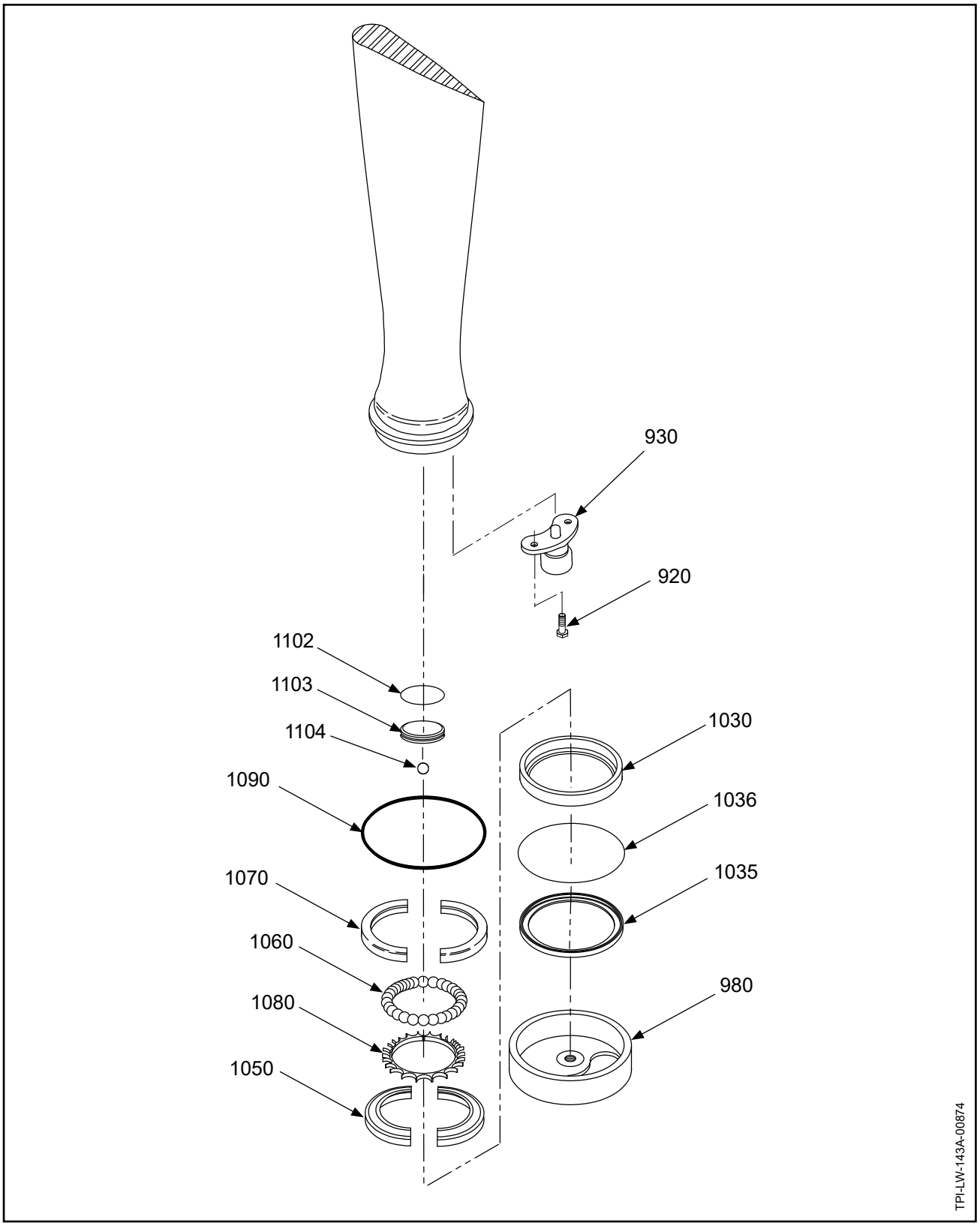
- ITEM NOT ILLUSTRATED



HC-E4N-3KTV: Propeller Parts
Figure 10-46



HC-E4N-3KTV: Beta System Parts
Figure 10-47



HC-E4N-3KTV: Blade Retention Parts
Figure 10-48

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-46		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KTV**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
-445	108046	• PCP: HUB ASSEMBLY, HC-E4(N,P,W)-3KTVY (REFER TO “108046 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION (ENGINE-SIDE OF HUB)		4	Y	
640A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640		4	Y	
650	106545	• PLUG, LUBRICATION, (CYLINDER-SIDE OF HUB)		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640 AND 640A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-46		**PROPELLER PARTS - HC-E4N-3KTV, CONTINUED**				
-670	103614	• FORK, FOUR BLADE - ASSEMBLY		1		
680	103548	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	103650	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3KTV, CONTINUED				
10-47		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		4		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3KTV, CONTINUED				
10-48		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3385-3H	• BOLT, 5/16-24, HEX HEAD		4	Y	
-925	102632	• TUBING, SILICONE		1	Y	
930	103545-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "103545-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	103525	• PRELOAD PLATE - ASSEMBLY (REFER TO "103525: PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	101512	• RING, BEARING, RETAINING		1		
1035	101437	• SEAL, BLADE		1		
1036	C-3317-045	• O-RING		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-341-8	• O-RING (BLADE MOUNTING)	E	1	Y	
1102	C-3317-028	• O-RING (BLADE PLUG)		1	Y	
1103	103413	• PLUG, BLADE		1		
1104	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		1	Y	

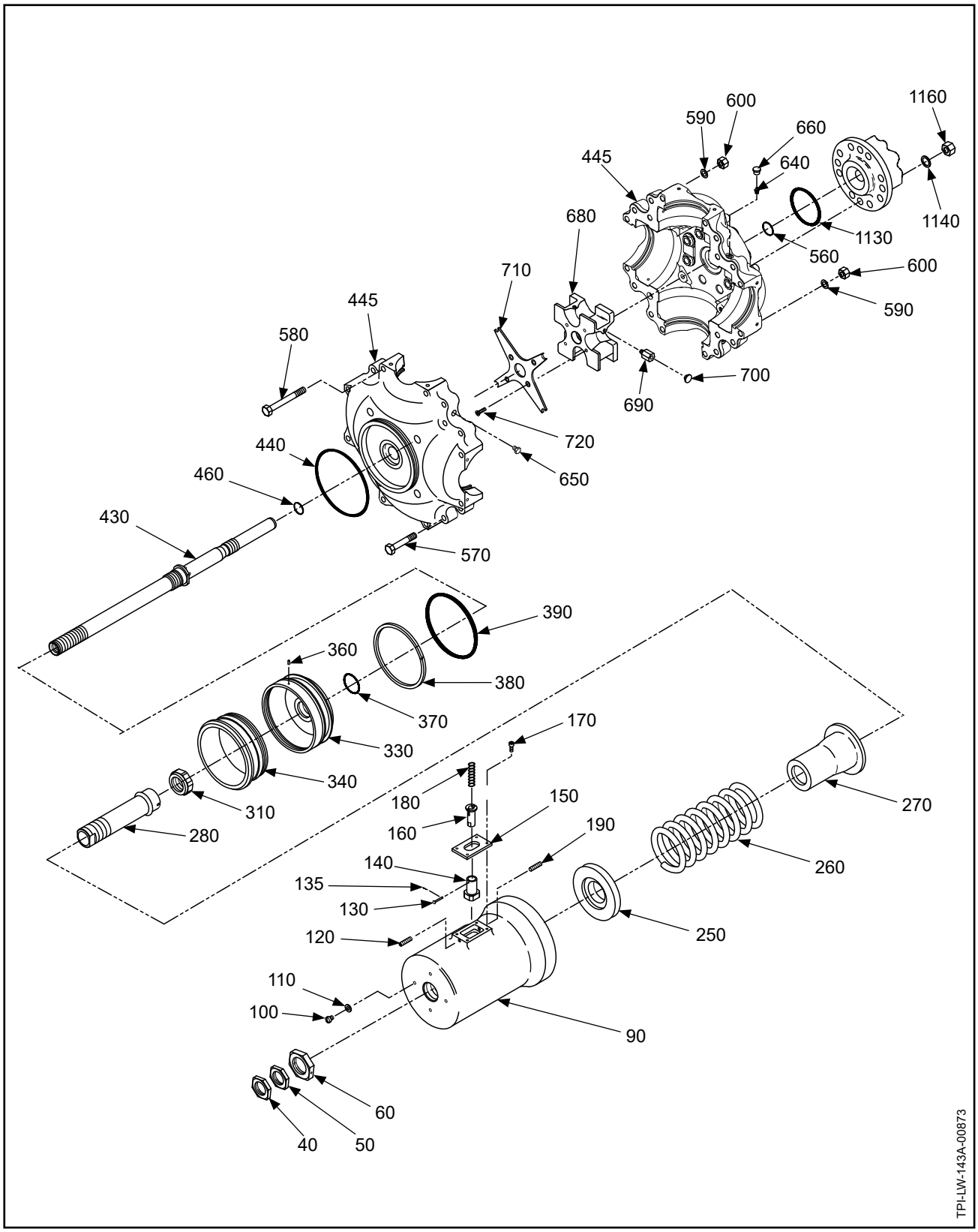
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL PROPELLER INC. ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

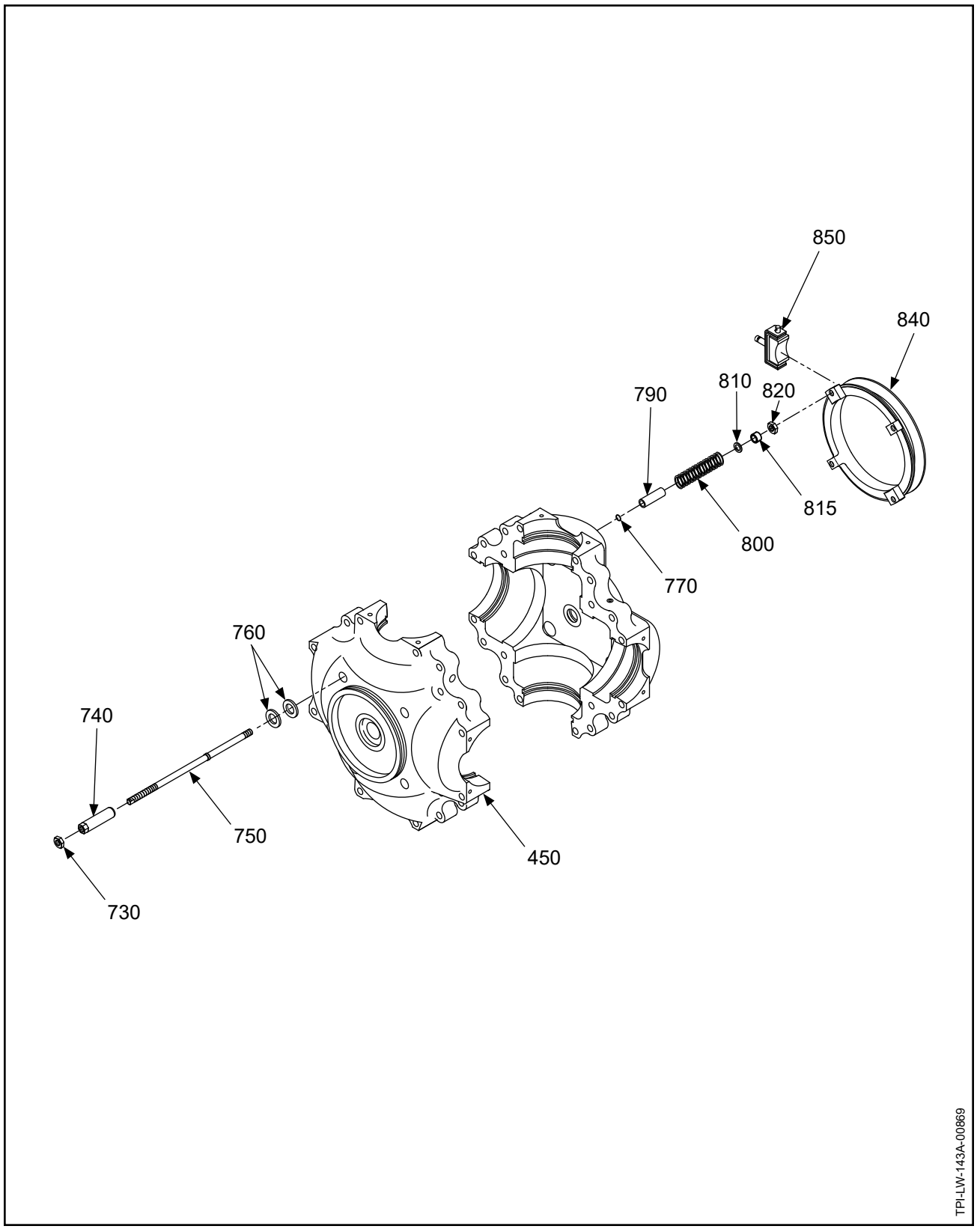
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-46		**PROPELLER PARTS - HC-E4N-3KTV, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	107963( )	• BALANCE WEIGHT (HUB ATTACHMENT)		AR		
-1125	102578	• BALANCE WEIGHT (BLADE ATTACHMENT)		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

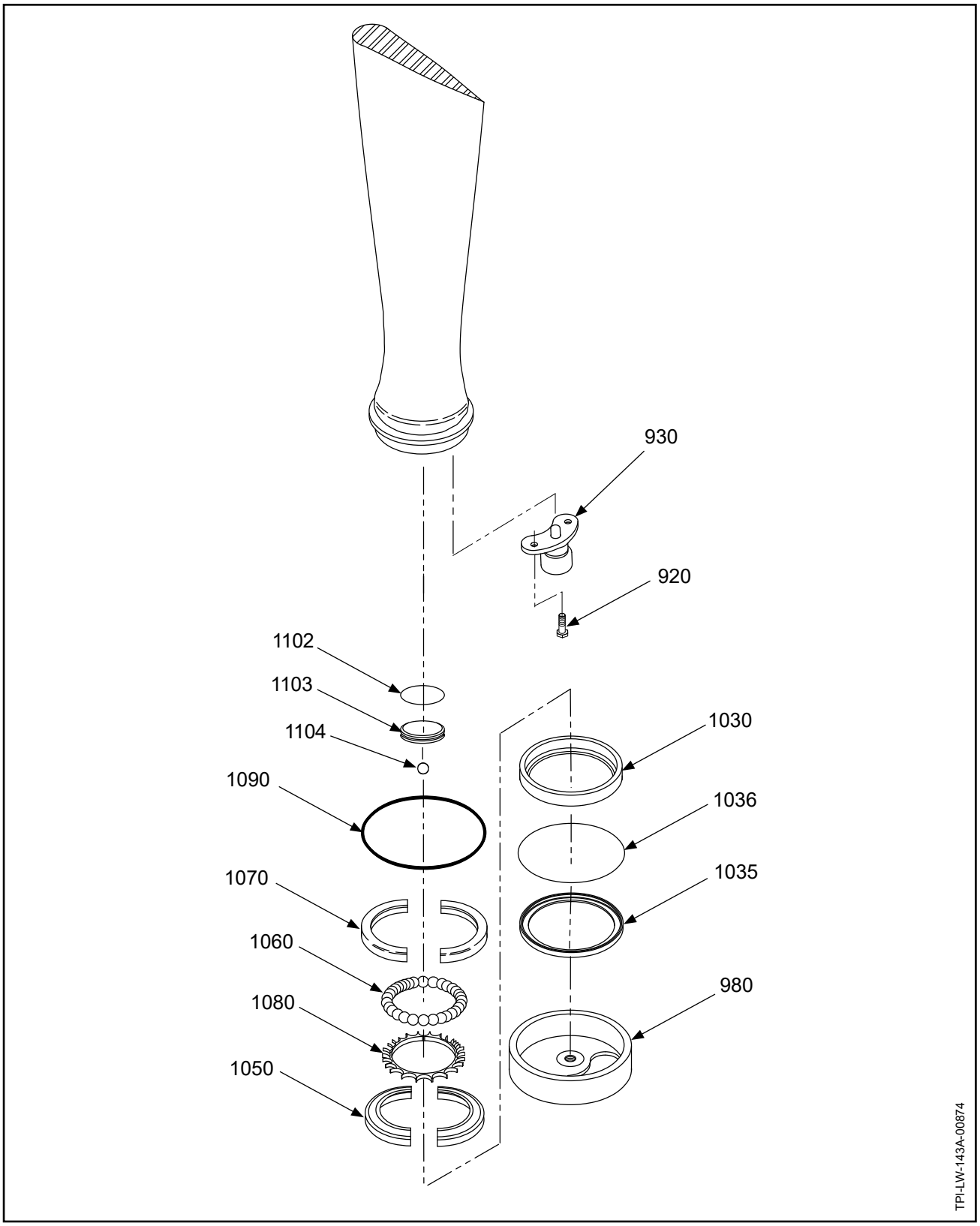
- ITEM NOT ILLUSTRATED



HC-E4N-3KTVY: Propeller Parts
Figure 10-49



HC-E4N-3KTVY: Beta System Parts
Figure 10-50



HC-E4N-3KTVY: Blade Retention Parts
Figure 10-51

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-49		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KTVY**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-484	• PCP: CYLINDER		1		
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
120	B-6639-131	• SCREW, SET		2	Y	
130	B-2877	• CLEVIS PIN, 3/32		2	Y	
135	B-3838-1	• COTTER PIN		2	Y	
140	B-444-4	• HOUSING, START LOCK		2		
150	B-446	• COVER, HOUSING, START LOCK		2		
160	A-2620-1	• PIN, START LOCK		2		
170	B-3821	• SCREW, 10-32, CAP		8	Y	
180	B-658	• SPRING, COMPRESSION, START LOCK		2	Y	
190	B-6639-131	• SCREW, SET		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
-320	C-497	• PISTON UNIT, REPLACED BY ITEM 320A		1		
-320A	C-497-3	• PISTON UNIT, REPLACES ITEM 320		1		
330	C-492	• • PISTON		1		
340	B-493	• • RING, PISTON, START LOCK		1		
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-49		**PROPELLER PARTS - HC-E4N-3KTVY, CONTINUED**				
-445	108046	• PCP: HUB ASSEMBLY, HC-E4(N,P,W)-3KTVY (REFER TO "108046 HUB ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION (ENGINE-SIDE OF HUB)		4	Y	
640A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640		4	Y	
650	106545	• PLUG, LUBRICATION, (CYLINDER-SIDE OF HUB)		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640 AND 640A		4	Y	
-670	103614	• FORK, FOUR BLADE - ASSEMBLY		1		
680	103548	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	103650	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3KTVY, CONTINUED				
10-50		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		4		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3KTVY, CONTINUED				
10-51		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3385-3H	• BOLT, 5/16-24, HEX HEAD		2	Y	
-925	102632	• TUBING, SILICONE		1	Y	
930	103545	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "103545-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	103525	• PRELOAD PLATE - ASSEMBLY (REFER TO "103525: PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	101512	• RING, BEARING, RETAINING		1		
1035	101437	• SEAL, BLADE		1		
1036	C-3317-045	• O-RING		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-341-8	• O-RING (BLADE MOUNTING)	E	1	Y	
1102	C-3317-028	• O-RING (BLADE PLUG)		1	Y	
1103	103413	• PLUG, BLADE		1		
1104	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

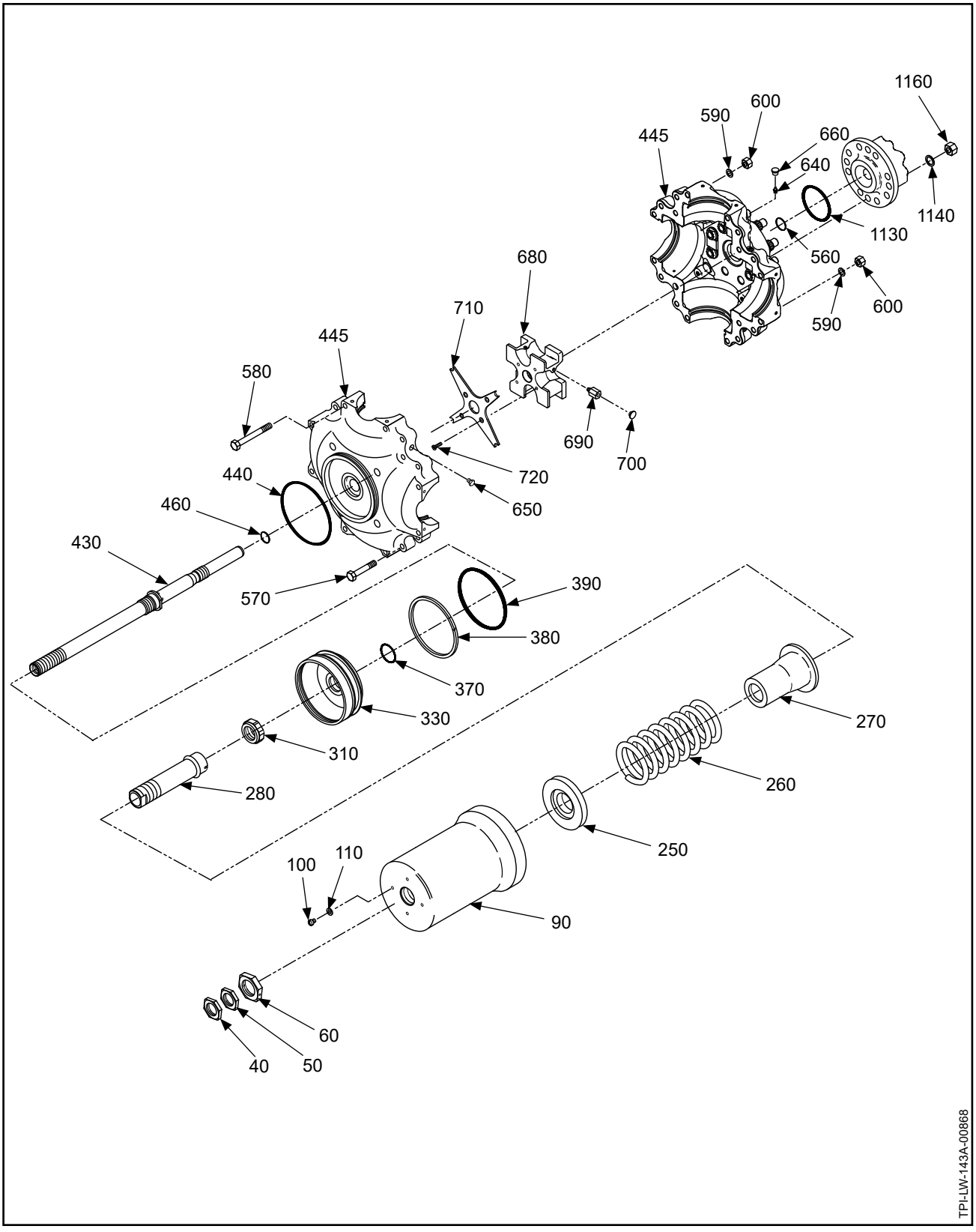
- ITEM NOT ILLUSTRATED

HC-E4N-3KTVY

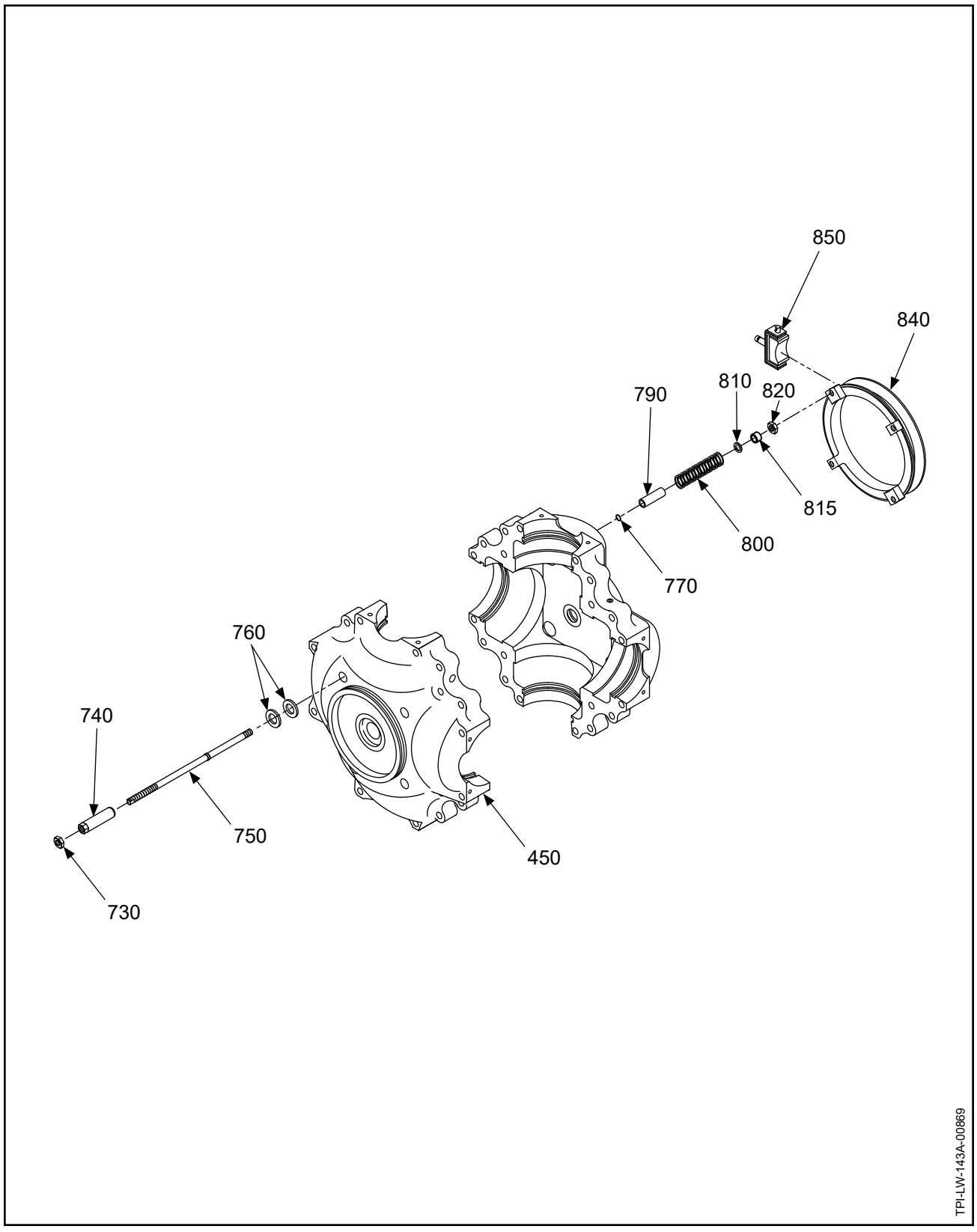
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-49		**PROPELLER PARTS - HC-E4N-3KTVY, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	107963( )	• BALANCE WEIGHT (HUB ATTACHMENT)		AR		
-1125	10763	• BALANCE WEIGHT (BLADE ATTACHMENT)		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

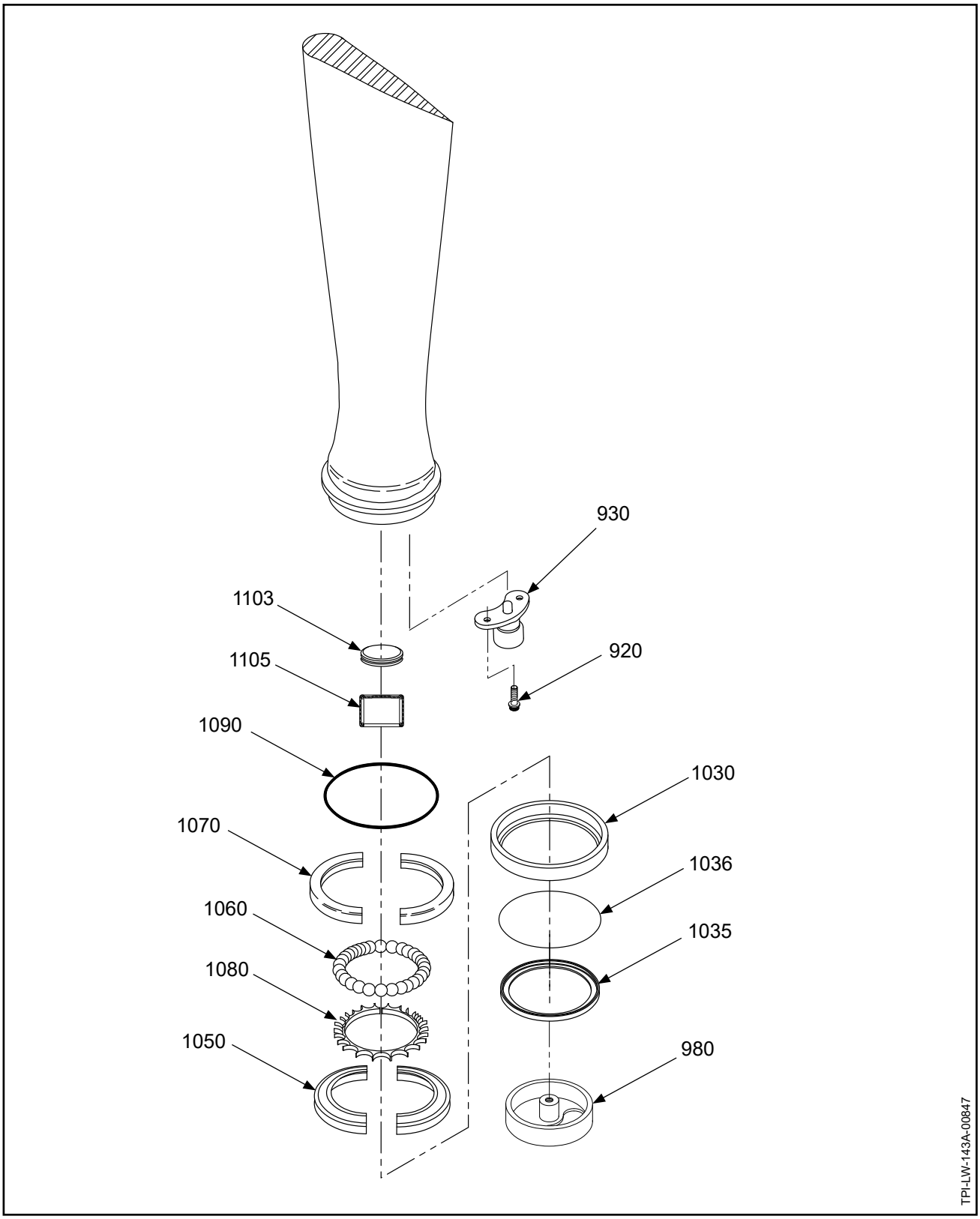
- ITEM NOT ILLUSTRATED



HC-E4N-3KU: Propeller Parts
Figure 10-51.1



HC-E4N-3KU: Beta System Parts
Figure 10-51.2



HC-E4N-3KU: Blade Retention Parts
Figure 10-51.3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-51.1		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KU**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488-1	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
-445	107222-1	• PCP: HUB - ASSEMBLY, HC-E4N-3KU (REFER TO “107222-1 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450	107210-1	• • PCP: HUB UNIT, HC-E4N-3KU		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	C-6349	• FITTING, LUBRICATION, 45° (ENGINE-SIDE OF HUB)		2	Y	
650	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		2	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-51.1		**PROPELLER ASSEMBLY PARTS - HC-E4N- 3KU, CONTINUED**				
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N- 3KU, CONTINUED				
10-51.2		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		1		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	107255	• RING, BETA		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3KU, CONTINUED				
10-51.3		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• SEAL, BLADE, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	
1103	A-665	• PLUG, BLADE		1		
1105	A-1271	• BEARING, NEEDLE, CLOSED END		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL PROPELLER INC. ALUMINUM BLADE MANUAL 133C (61-13-33)		

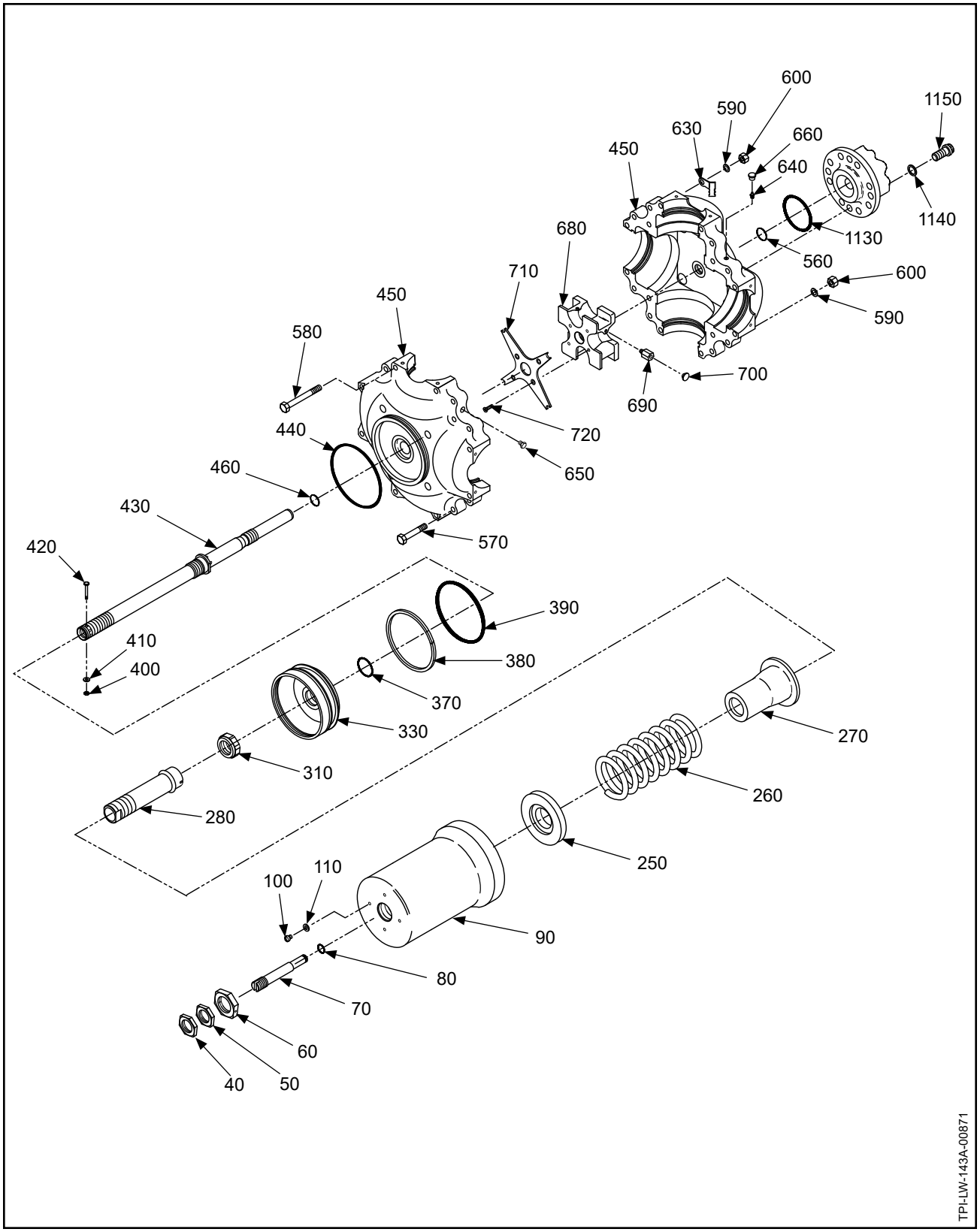
- ITEM NOT ILLUSTRATED

HC-E4N-3KU

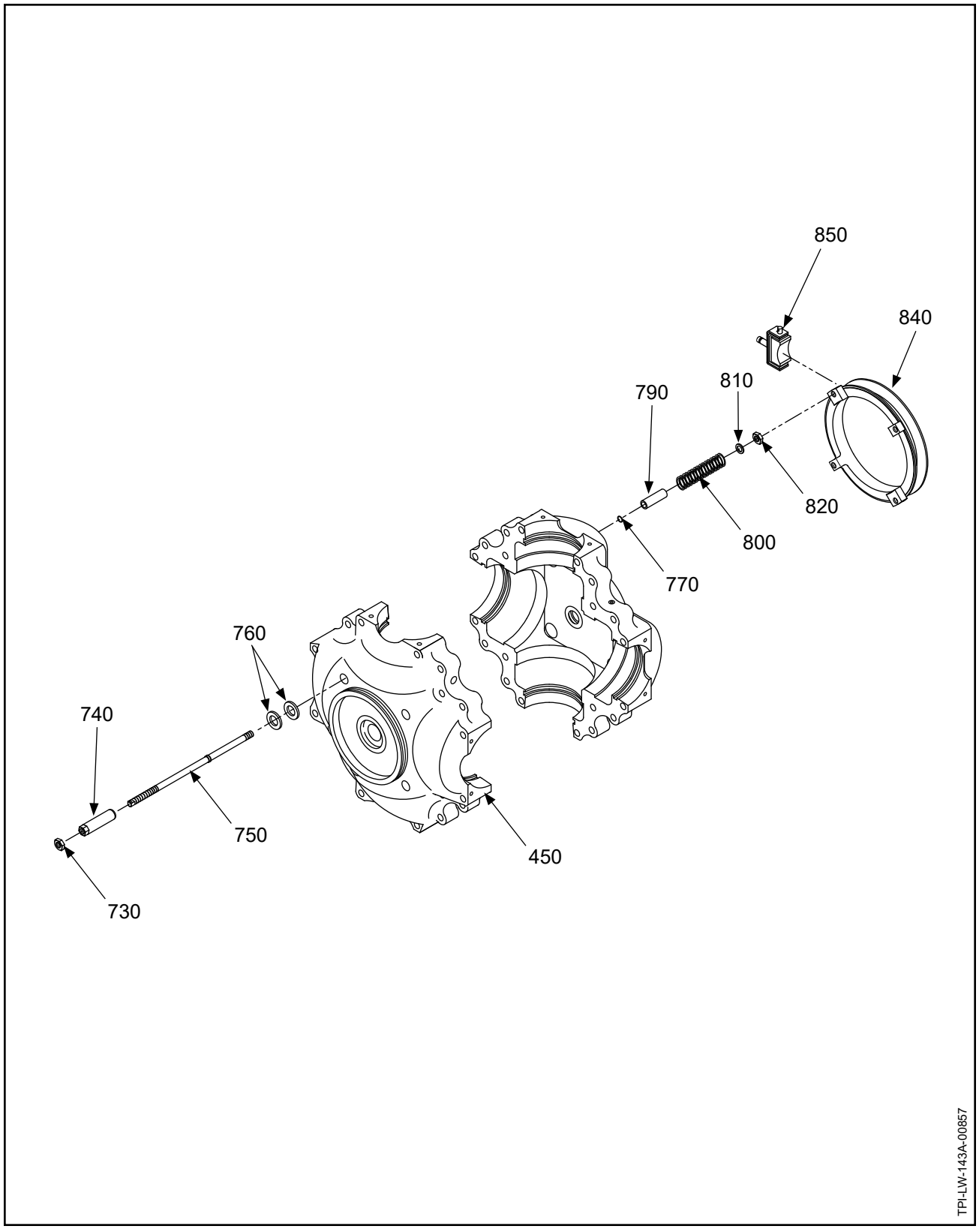
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-51.1		**PROPELLER ASSEMBLY PARTS - HC-E4N-3KU, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

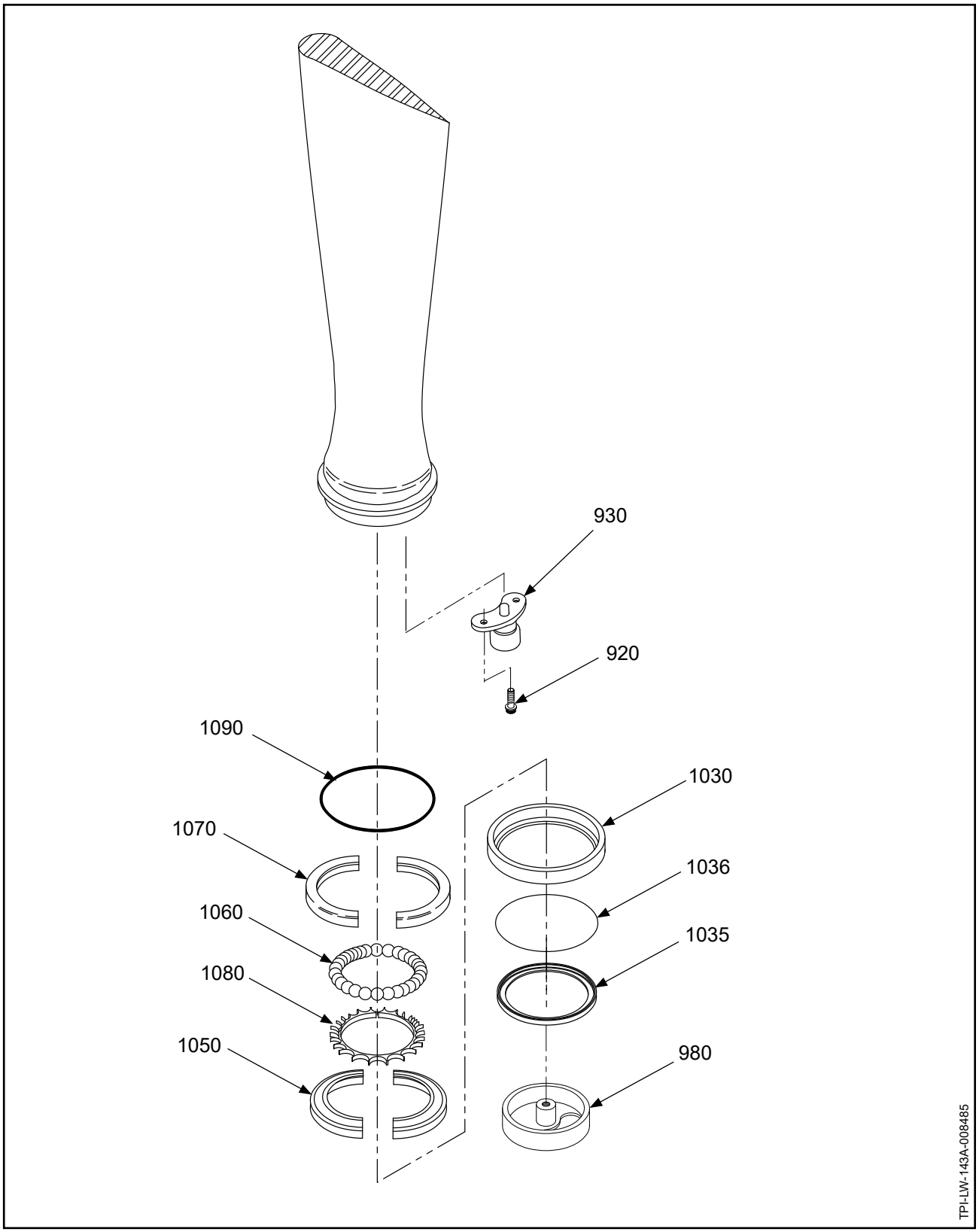
- ITEM NOT ILLUSTRATED



HC-E4N-3M: Propeller Parts
Figure 10-52



HC-E4N-3M: Beta System Parts
Figure 10-53



HC-E4N-3M: Blade Retention Parts
Figure 10-54

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-52		**PROPELLER PARTS - HC-E4N-3M**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430A		1		
80	C-3317-013	• O-RING (PITCH CHANGE ROD PLUG) NOT USED WITH ITEM 430A		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1	Y	
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING (PISTON ID)		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING (PISTON OD)		1	Y	
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430A		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430A		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430A		1	Y	
430	D-6071-1	• PCP: ROD, PITCH CHANGE SUPERSEDED BY ITEM 430A		1		PCP
430A	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430		1		PCP
440	C-3317-251	• O-RING (CYLINDER MOUNTING)		1	Y	
460	C-3317-213-2	• O-RING (CYLINDER-SIDE BUSHING ID)		1	Y	
450	D-5126-3	• PCP: HUB UNIT, HC-E4N-3 (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-52		**PROPELLER PARTS - HC-E4N-3M, CONTINUED**				
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
610	B-7073-L1	• BOLT, 10-32, HEX HEAD, LIGHTNING		4	Y	
630	B-6265	• WIRE HARNESS BRACKET		4		
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-E4N-3M

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3M, CONTINUED				
10-53		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING (RETAINER)		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3M, CONTINUED				
10-54		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3830	• TWELVE POINT BOLT		2	Y	
930	100032-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO "100032-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-6257-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 (REFER TO "B-6257-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	B-6770	• PRELOAD PLATE ASSEMBLY REPLACED BY ITEM 980A (REFER TO "B-6770 PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	100641	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1030A		1		
1030A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1030		1		
1035	B-7726	• BLADE SEAL, OPTIONAL, USED WITH ITEM 1030A		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030A		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090A SUPERSEDED BY ITEM 1090B		1	Y	
1090A	C-3317-340-3	• O-RING (BLADE MOUNTING), ALTERNATE SUPERSEDED BY ITEM 1090		1	Y	
1090B	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

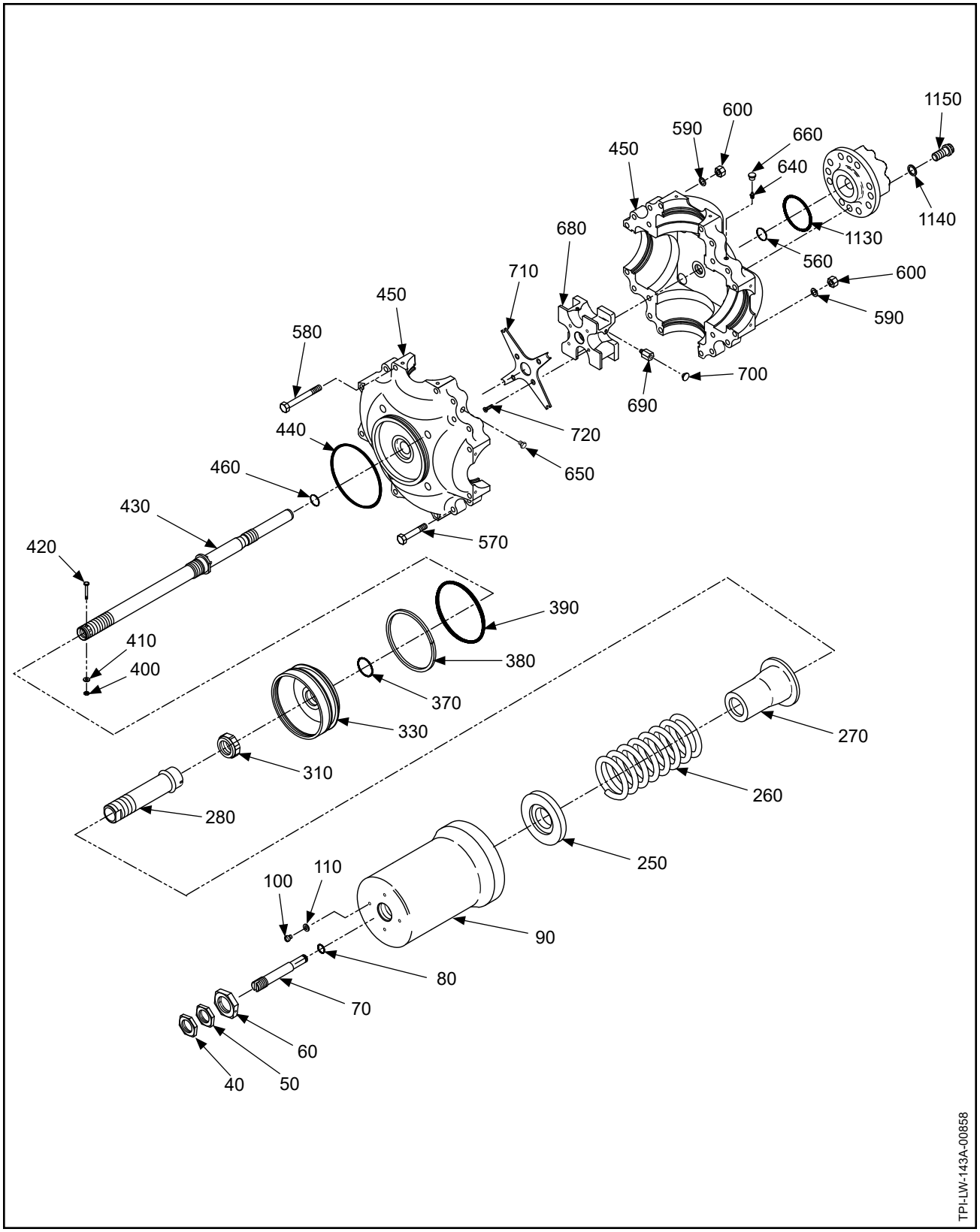
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

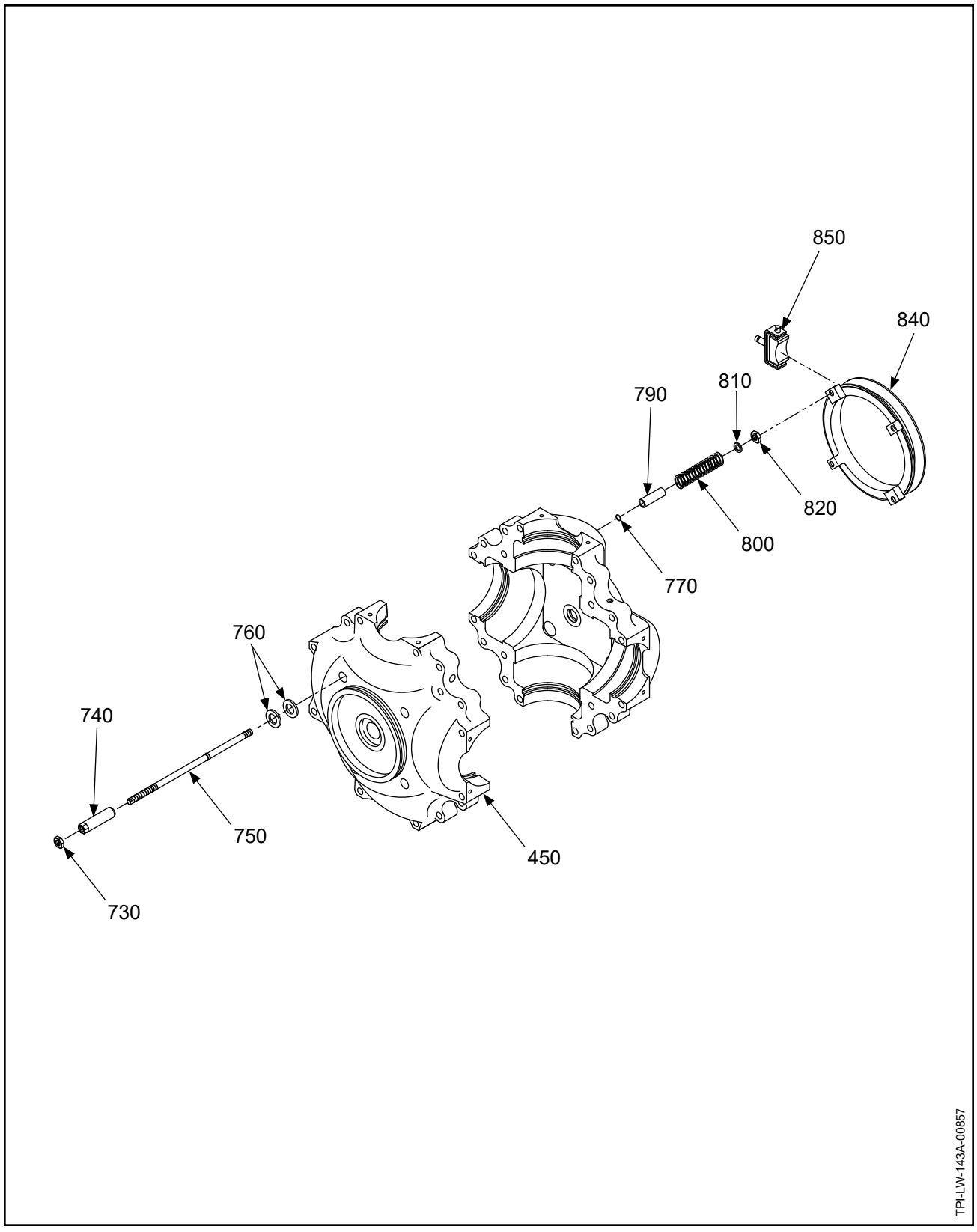
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-52		**PROPELLER PARTS - HC-E4N-3M, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-9040		• COUNTERWEIGHT SLUGS				
-9041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-9042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

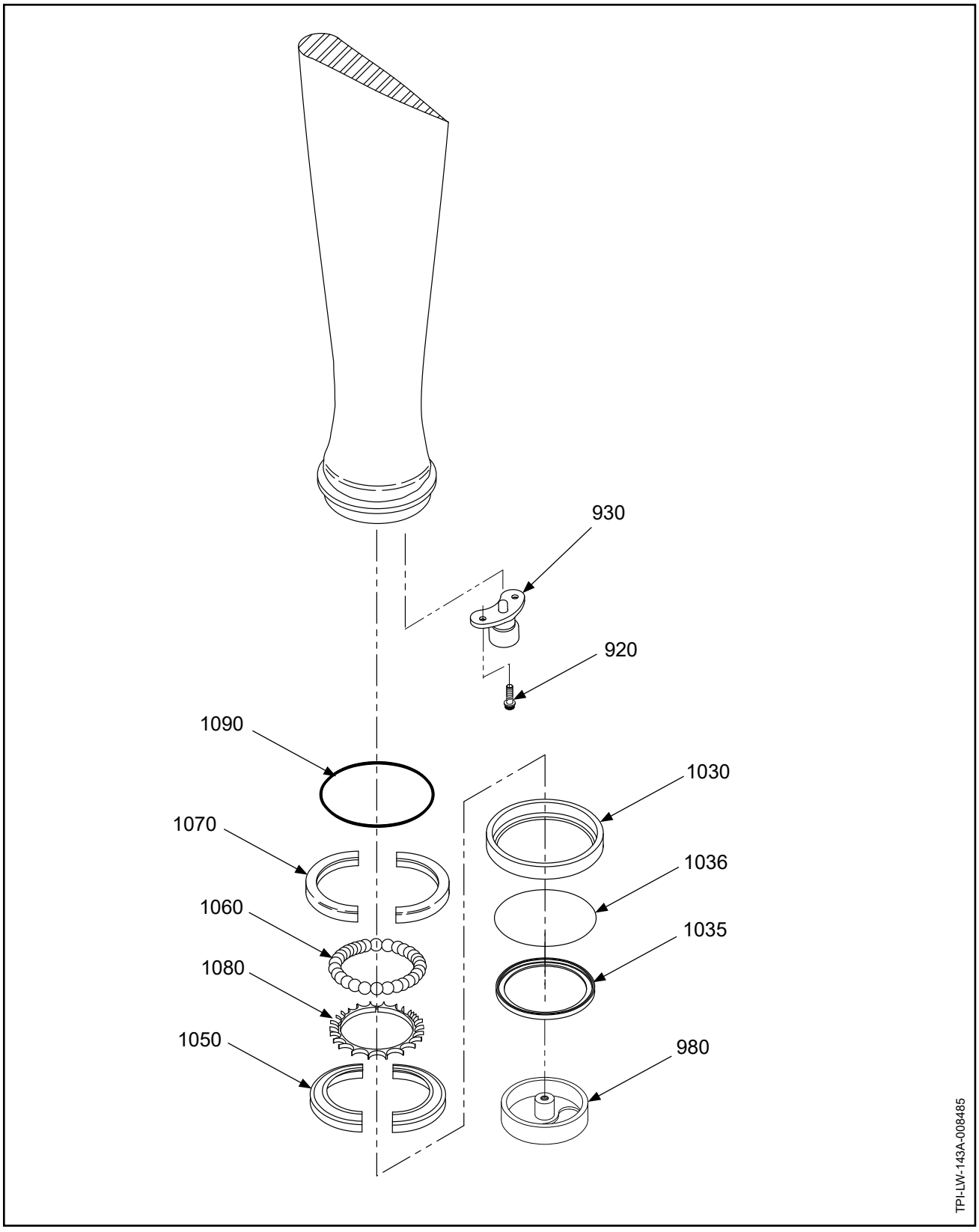
- ITEM NOT ILLUSTRATED



HC-E4N-3N: Propeller Parts
Figure 10-55



HC-E4N-3N: Beta System Parts
Figure 10-56



HC-E4N-3N: Blade Retention Parts
Figure 10-57

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-55		**PROPELLER PARTS - HC-E4N-3N**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430D		1		
80	C-3317-013	• O-RING, PITCH CHANGE ROD PLUG NOT USED WITH ITEM 430D		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-447	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 260A	A	1		PCP
260A	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 260	A	1		PCP
270	B-442	• GUIDE, SPRING, PLASTIC SUPERSEDED BY ITEM 270A		1	Y	
270A	B-6761	• GUIDE, SPRING, PLASTIC SUPERSEDES ITEM 270		1	Y	
280	B-476	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDED BY ITEM 280A		1		PCP
-290	C-438	• • PCP: SLEEVE, REVERSE ADJUST SUPERSEDED BY ITEM 290A		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
280A	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT SUPERSEDES ITEM 280		1		PCP
-290A	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 290		1		PCP
-300A	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	

NOTE 1: If the C-447 feathering compression spring is currently in the propeller and must be replaced, the A-6828 feathering spring kit must be used. The A-6828 feathering spring kit contains: B-6758 pitch adjust sleeve unit, C-6760 feathering compression spring, B-6761 spring guide, and B-6768 forward spring retainer.

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	REFER TO NOTE 1		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-55		**PROPELLER PARTS - HC-E4N-3N, CONTINUED**				
400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430D		1	Y	
410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430D		1	Y	
420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430D		1	Y	
430	D-6071	• PCP: ROD, PITCH CHANGE REPLACED BY ITEM 430A		1		PCP
430A	D-6071-1	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 430 SUPERSEDED BY ITEM 430D		1		PCP
430B	D-494	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACED BY ITEM 430C		1		PCP
430C	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE REPLACES ITEM 430B, POST HC-SB-61-215 SUPERSEDED BY ITEM 430D		1		PCP
430D	D-6506	• PCP: ROD, PITCH CHANGE SUPERSEDES ITEM 430A, POST HC-SL-61-240 SUPERSEDES ITEM 430C		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-5126-3	• PCP:HUB UNIT, HC-E4N-3 (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
450A	D-5126-2	• PCP:HUB UNIT, HC-E4N-3, ALTERNATE (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• SELF-LOCKING HEX3/8-24 NUT		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-55		**PROPELLER PARTS - HC-E4N-3N, CONTINUED**				
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3N, CONTINUED				
10-56		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER PARTS - HC-E4N-3N, CONTINUED				
10-57		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 108303 (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY, REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980, POST HC-SB-61-289 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING, POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030, USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	

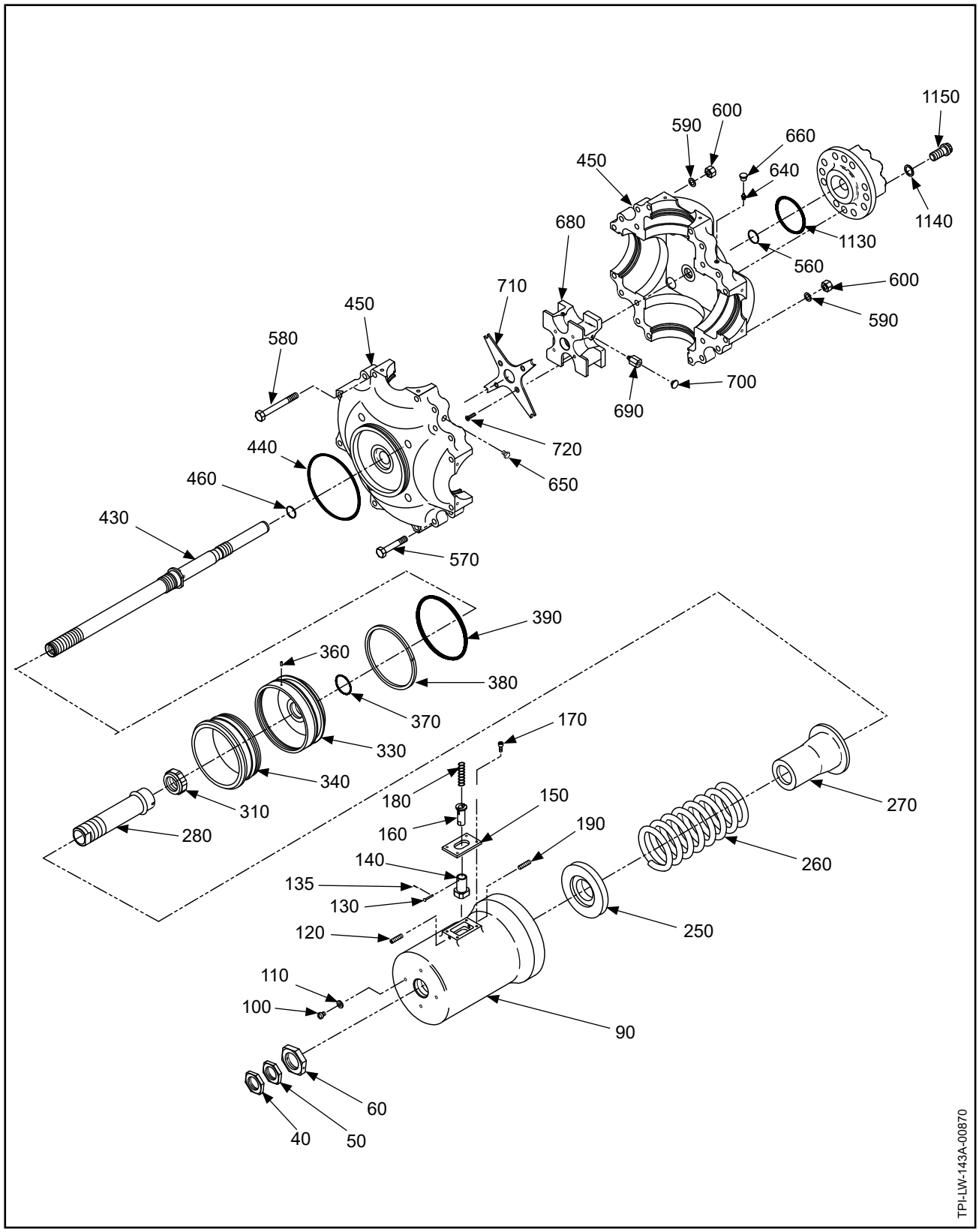
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

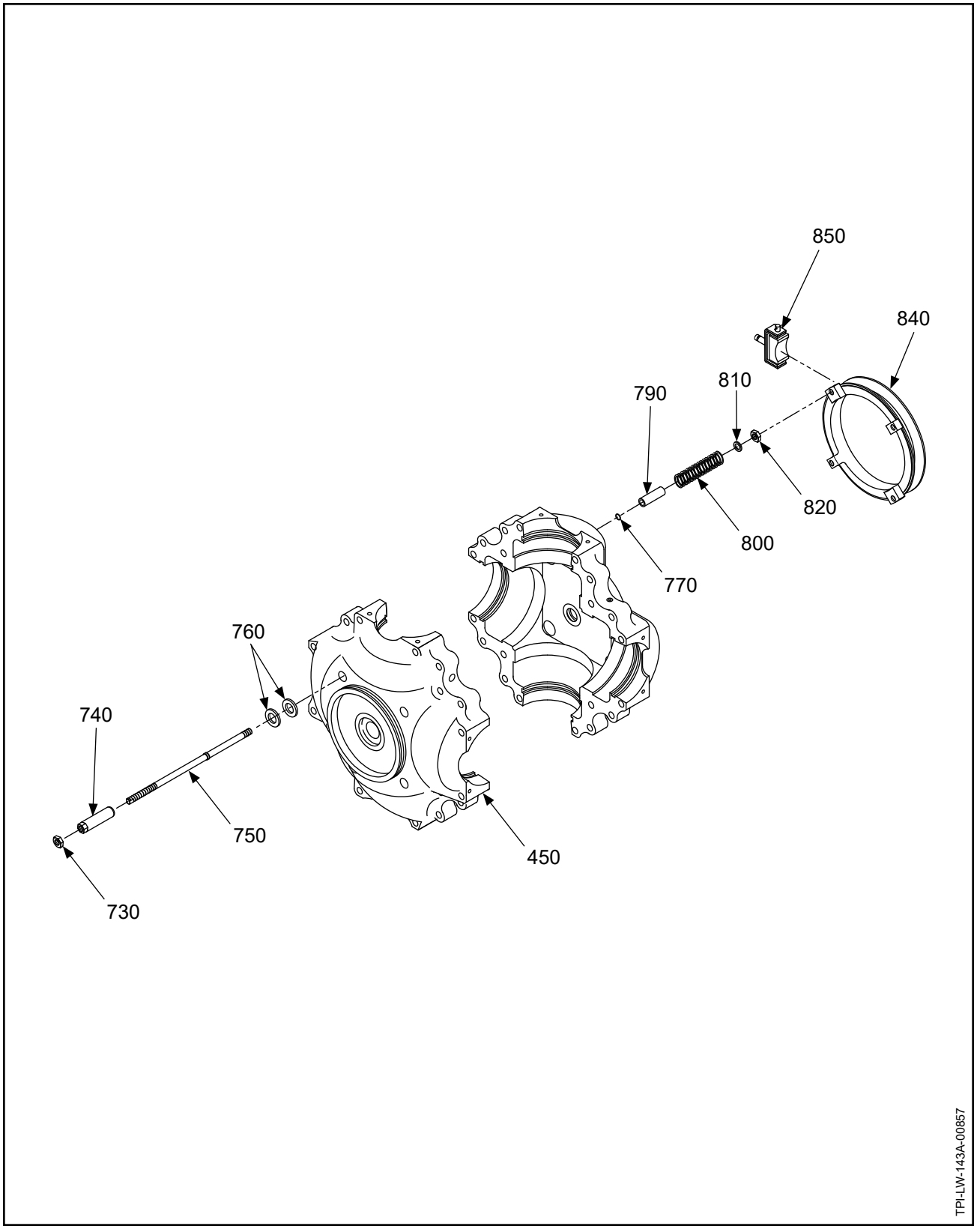
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-55		**PROPELLER PARTS - HC-E4N-3N, CONTINUED**				
1090	C-3317-340	• O-RING (BLADE MOUNTING), SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

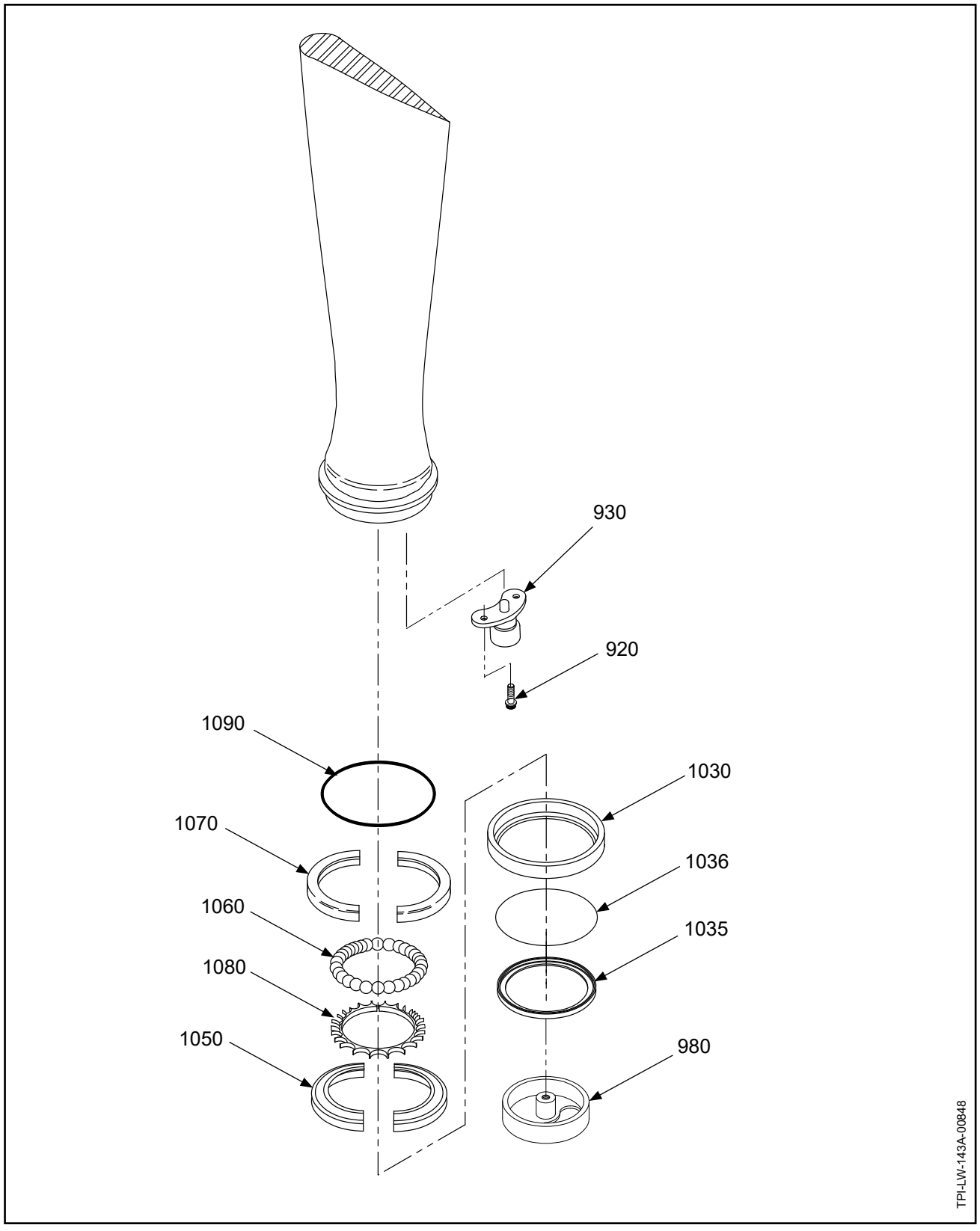
- ITEM NOT ILLUSTRATED



HC-E4N-3PY: Propeller Parts
Figure 10-58



HC-E4N-3PY: Beta System Parts
Figure 10-59



HC-E4N-3PY: Blade Retention Parts
Figure 10-60

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-58		**PROPELLER ASSEMBLY PARTS - HC-E4N-3PY**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-484	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
120	B-6639-131	• SCREW, SET		4	Y	
130	B-2877	• CLEVIS PIN, 3/32		2	Y	
135	B-3838-1	• COTTER PIN		2	Y	
140	B-444-4	• HOUSING, START LOCK		2		
150	B-446	• COVER, HOUSING, START LOCK		2		
160	A-2620-1	• PIN, START LOCK		2		
170	B-3821	• SCREW, 10-32, CAP		8	Y	
180	B-658	• SPRING, COMPRESSION, START LOCK		2	Y	
190	B-6639-131	• SCREW, SET		2	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
320	C-497	• PISTON UNIT		1		
330	C-492	• • PISTON		1		
340	B-493	• • RING, PISTON, START LOCK			1	
360	B-3842-0250	• • SPRING PIN, 3/32 INCH, CRES		1	Y	
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
450	D-5126-3	• PCP: HUB UNIT, HC-E4N-3 (REFER TO “D-5126-( ) HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-58		PROPELLER ASSEMBLY PARTS - HC-E4N-3PY, CONTINUED				
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3PY, CONTINUED				
10-59		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4N-3P, CONTINUED				
10-60		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	101004	• PRELOAD PLATE ASSEMBLY (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING POST HC-SL-61-241, R3, SUPERSEDES ITEM 1030 USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090A, SUPERSEDED BY ITEM 1090B		1	Y	
1090A	C-3317-340-3	• O-RING (BLADE MOUNTING), ALTERNATE SUPERSEDED BY ITEM 1090		1	Y	

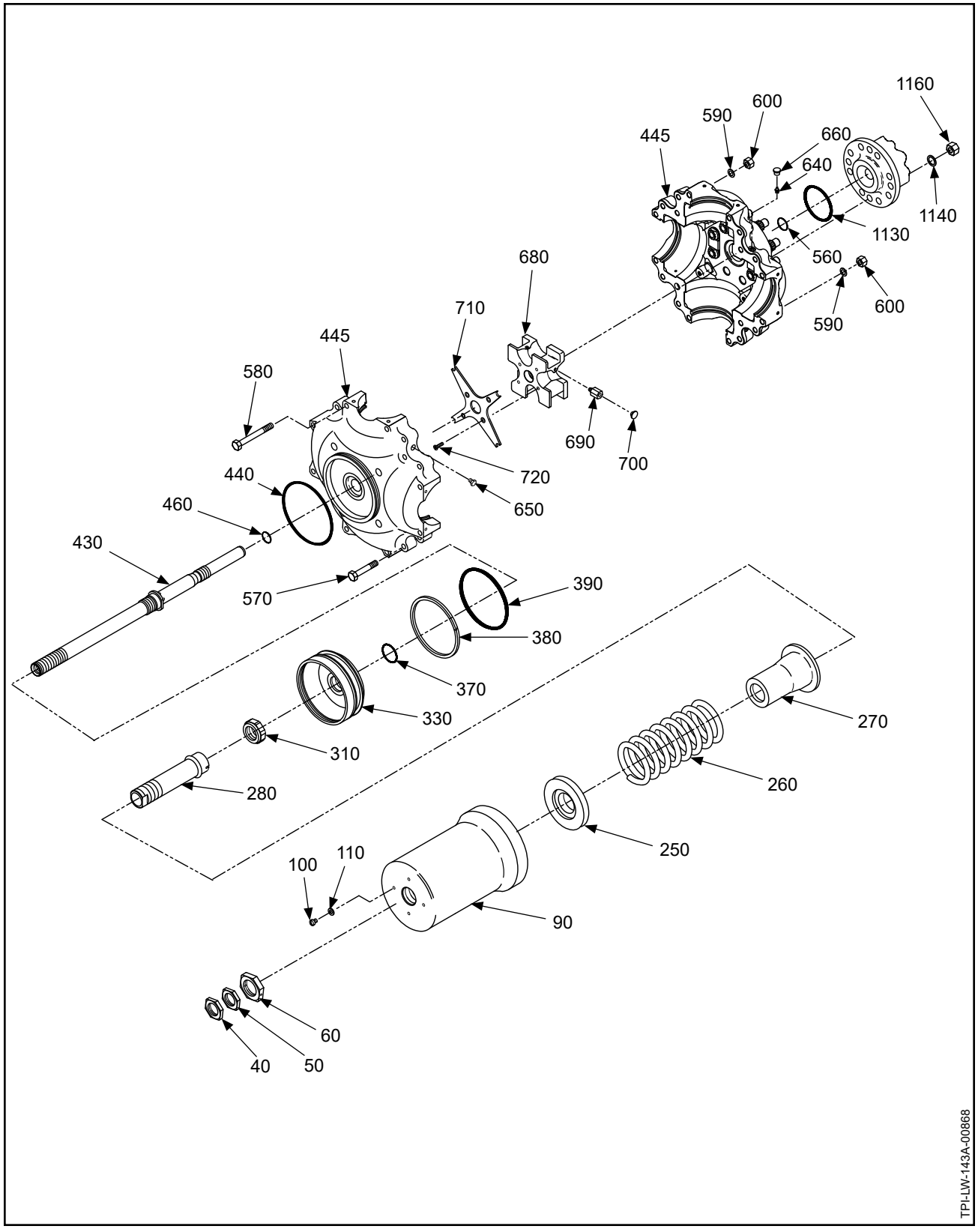
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

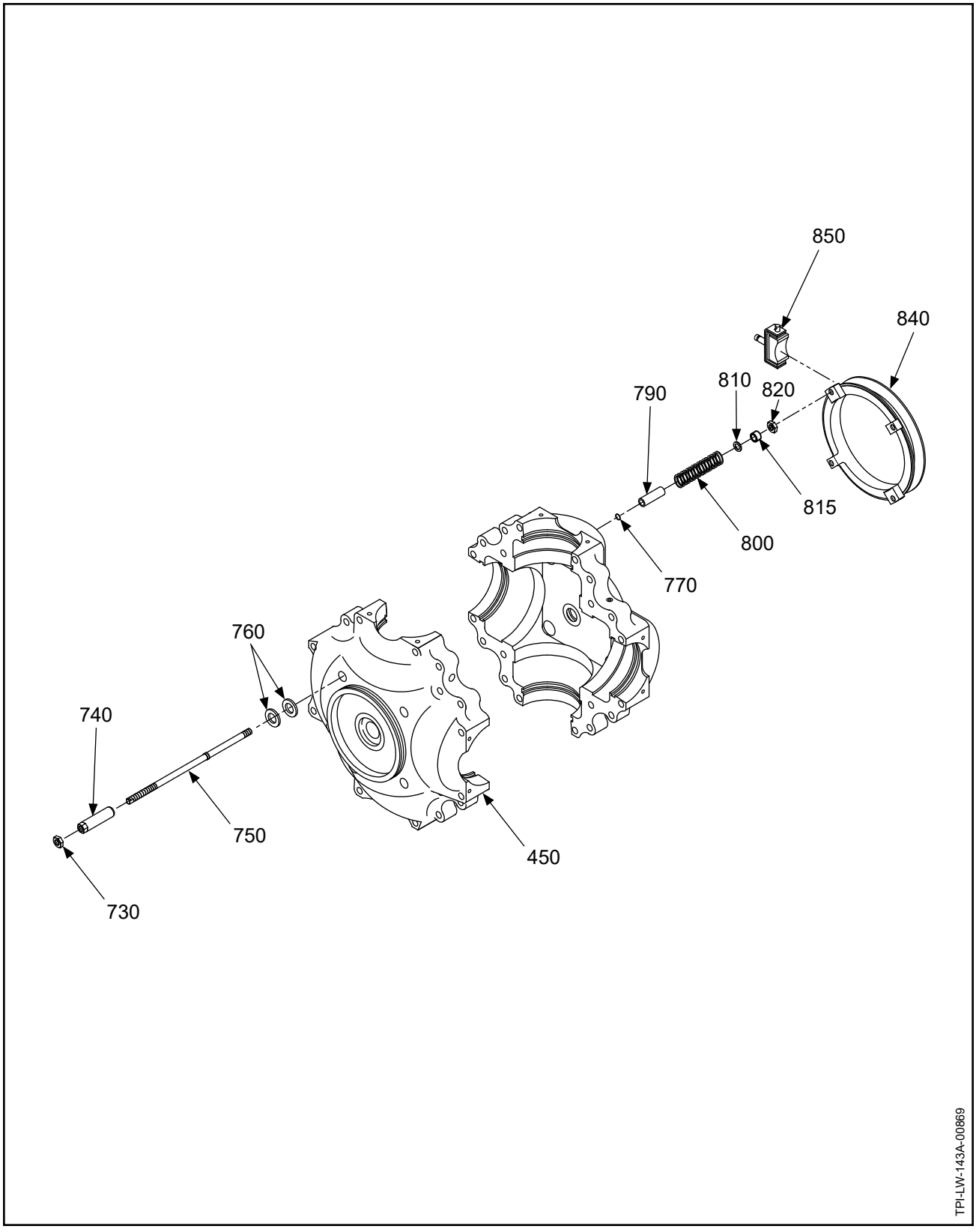
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-58		**PROPELLER ASSEMBLY PARTS - HC-E4N-3PY, CONTINUED**				
1090B	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1150	B-3339-1	• TWELVE POINT 9/16-18 MOUNTING BOLT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

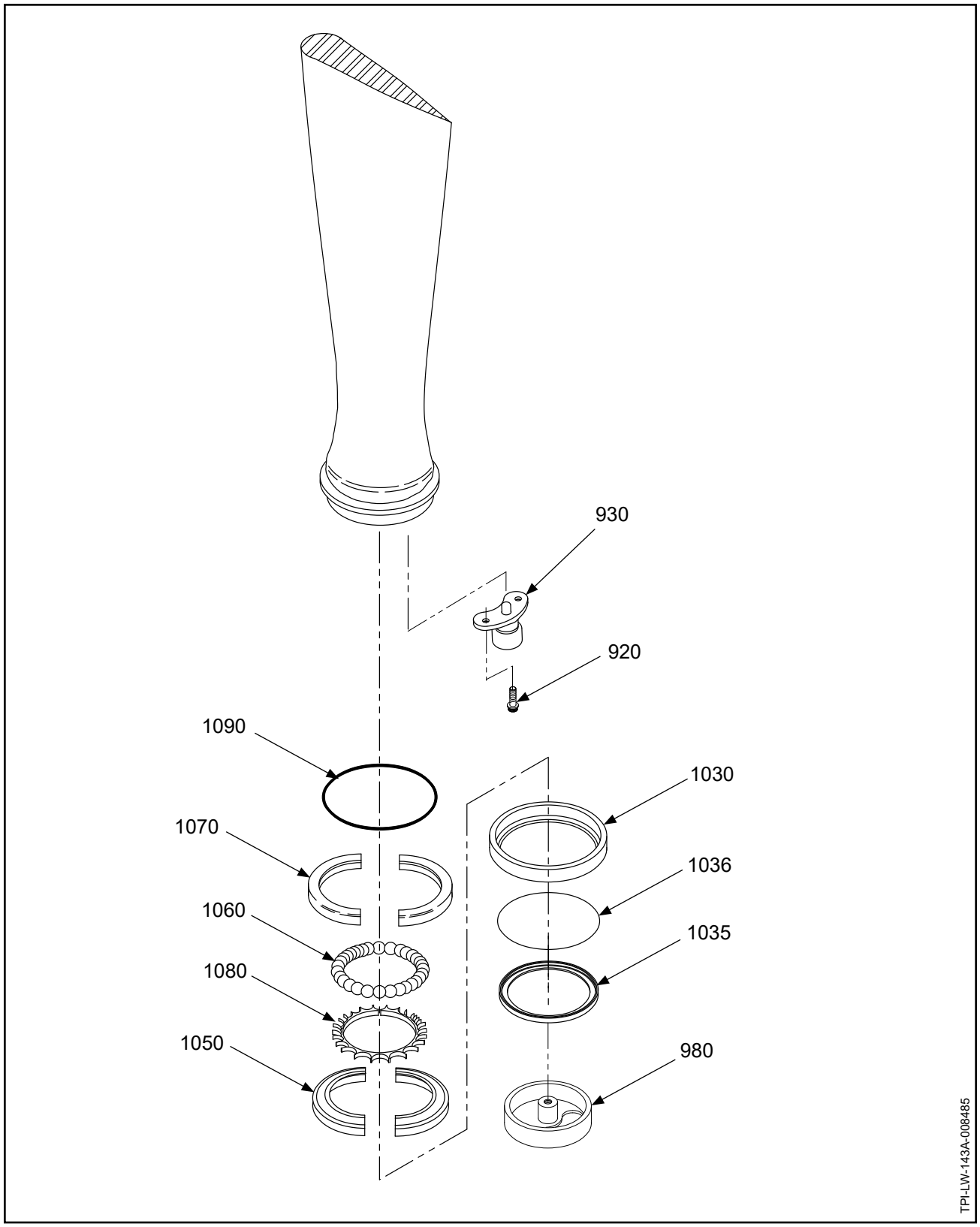
- ITEM NOT ILLUSTRATED



HC-E4P-3K: Propeller Parts
Figure 10-61



HC-E4P-3K: Beta System Parts
Figure 10-62



HC-E4P-3K: Blade Retention Parts
Figure 10-63

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-61		**PROPELLER ASSEMBLY PARTS - HC-E4P-3K**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	103872	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
-445	103748	• PCP: HUB - ASSEMBLY, HC-E4P-3K (REFER TO “103748 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-61		**PROPELLER ASSEMBLY PARTS - HC-E4P-3K, CONTINUED**				
680	D-495-2	• FORK, FOUR BLADE		1		
690	B-468	• EXTENSION, BUMPER		4		
700	A-3256	• BUMPER, FORK		4	Y	
710	C-6475	• PLATE, BETA PICKUP		1		
720	B-6521-8	• SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4P-3K, CONTINUED				
10-62		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	101649	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
815	101382	• SPACER		1		
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	101383	• BETA RING - UNIT		1		
-845	B-3333	• • RING, INDICATOR, BETA SWITCH		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4P-3K, CONTINUED				
10-63		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO “100641-( ) PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• SEAL, BLADE, OPTIONAL, USED WITH ITEM 1030		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	

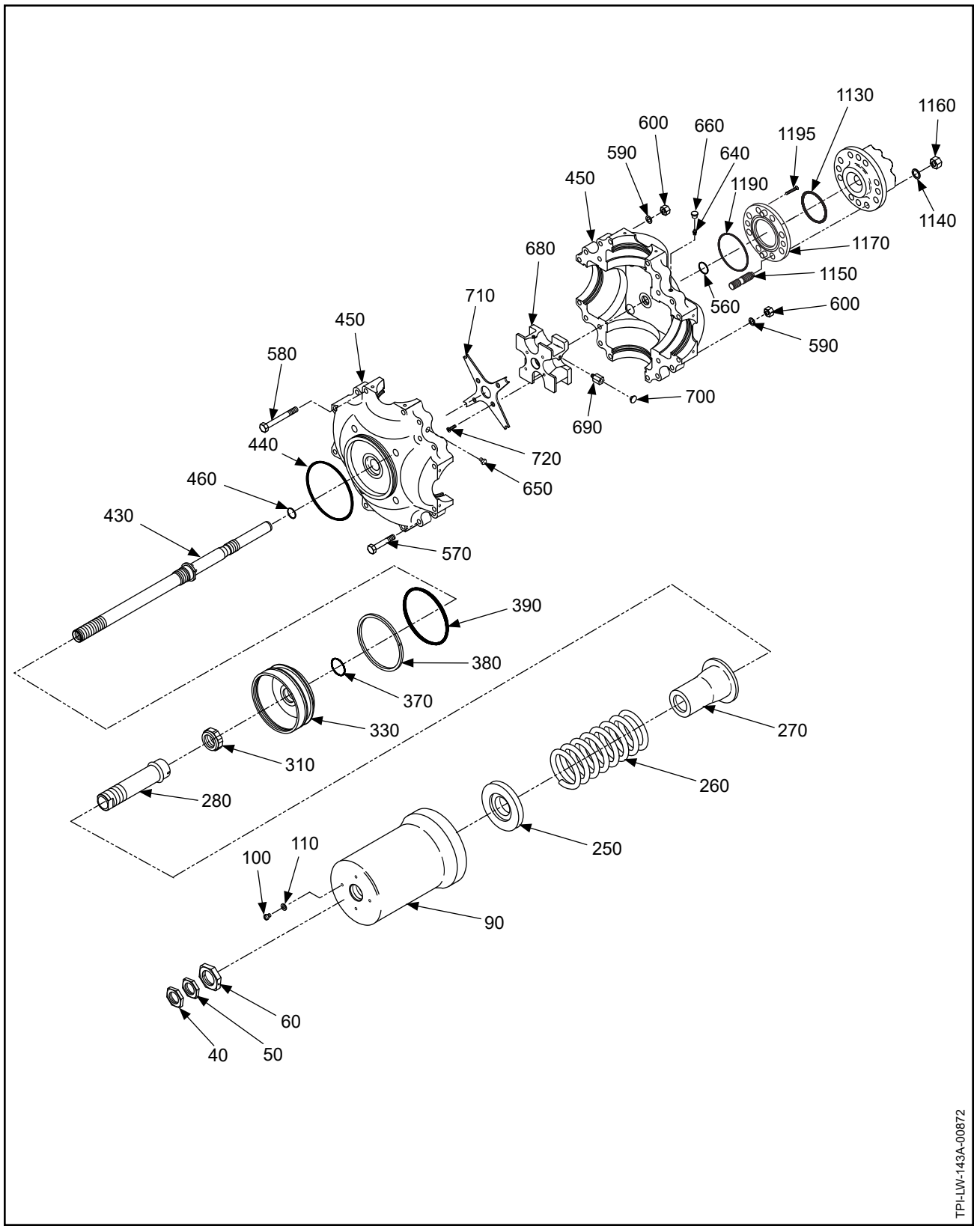
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

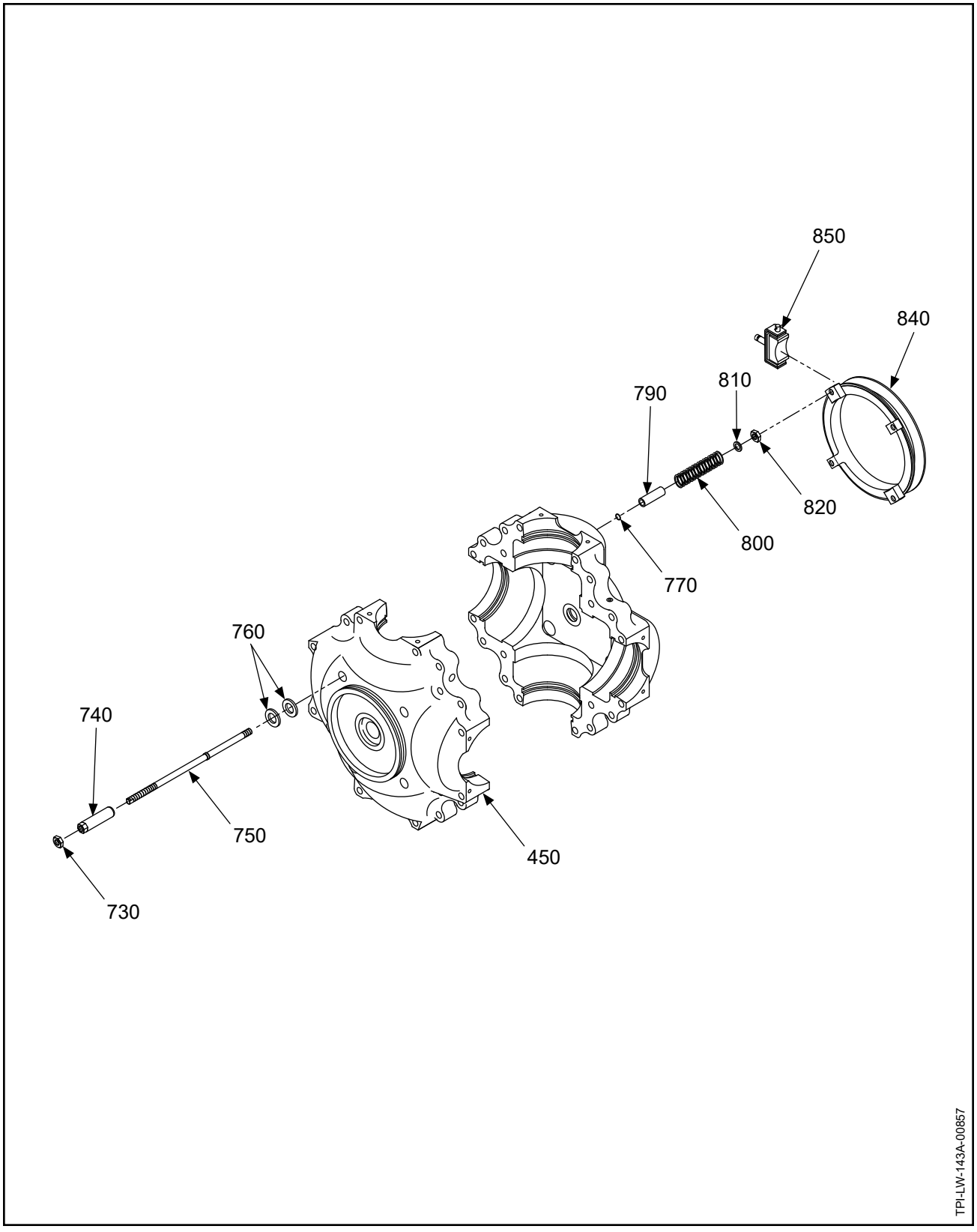
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-61		**PROPELLER ASSEMBLY PARTS - HC-E4P-3K, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
-1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
1160	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

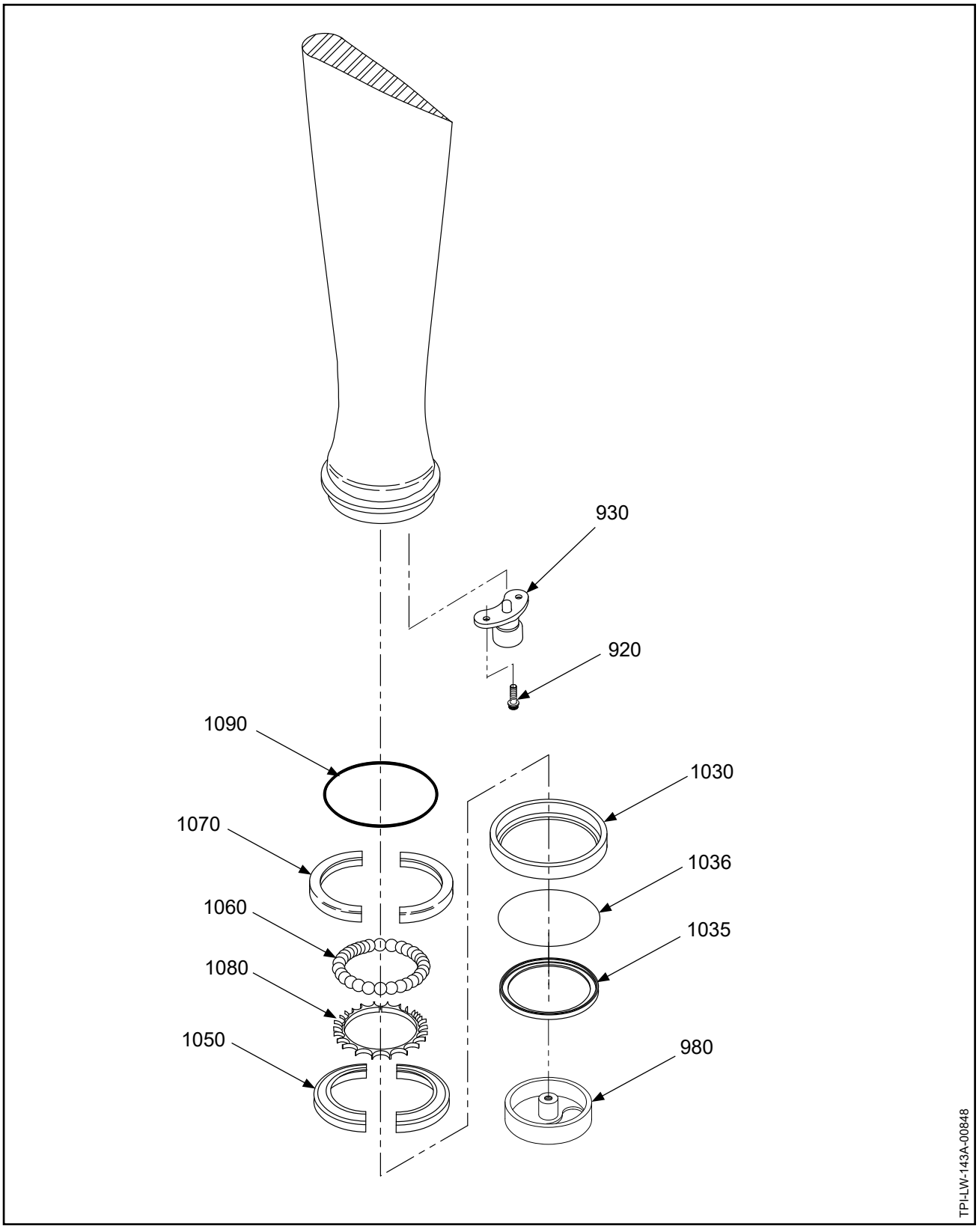
- ITEM NOT ILLUSTRATED



HC-E4W-3: Propeller Parts
Figure 10-64



HC-E4W-3: Beta System Parts
Figure 10-65



HC-E4W-3: Blade Retention Parts
Figure 10-66

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-61		**PROPELLER ASSEMBLY PARTS - HC-E4W-3**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
-70	B-449	• PLUG, ROD, PITCH CHANGE NOT USED WITH ITEM 430B		1		
-80	C-3317-013	• O-RING, (PITCH CHANGE ROD PLUG) NOT USED WITH ITEM 430B		1	Y	
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING (PISTON ID)		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING (PISTON OD)		1	Y	
-400	B-3808-3	• NUT, HEX, SELF-LOCKING NOT USED WITH ITEM 430B		1	Y	
-410	B-3851-0363	• WASHER, NOT USED WITH ITEM 430B		1	Y	
-420	B-3383-15	• BOLT, 10-32, HEX HEAD NOT USED WITH ITEM 430B		1	Y	
430	D-6071-1	• PCP: ROD, PITCH CHANGE, SUPERSEDED BY ITEM 430B		1		PCP
430A	D-494-1	• PCP: ROD, PITCH CHANGE, ALTERNATE FOR ITEM 430		1		PCP
430B	D-6506	• PCP: ROD, PITCH CHANGE, SUPERSEDES ITEM 430 AND ITEM 430A POST HC-SL-61-240		1		PCP
440	C-3317-251	• O-RING (CYLINDER MOUNTING)		1	Y	
460	C-3317-213-2	• O-RING		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-64		**PROPELLER ASSEMBLY PARTS - HC-E4W-3, CONTINUED**				
450	E-7619	• PCP: HUB UNIT, HC-E4W-3( ) (REFER TO "E-7619 HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)			1	Y
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3, CONTINUED				
10-65		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3, CONTINUED				
10-66		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930B (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	B-464-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO “B-464-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930B	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	C-459	• PRELOAD PLATE ASSEMBLY REPLACED BY ITEM 980A (REFER TO “C-459 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980A	101004	• PRELOAD PLATE ASSEMBLY REPLACES ITEM 980 (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	A-2204	• RING, RETAINING, BEARING SUPERSEDED BY ITEMS 1030A, 1035, AND 1036		1		
1030A	102158	• RING, RETAINING, BEARING POST HC-SL-61-241, R3 SUPERSEDES ITEM 1030 USE WITH ITEMS 1035 AND 1036		1		
1035	B-7726	• SEAL, BLADE, POST HC-SL-61-241, R3 USE WITH ITEMS 1030A AND 1036		1		
1036	C-3317-045	• O-RING, POST HC-SL-61-241, R3 USE WITH ITEM 1030A AND 1035		1		
-1040	A-2202	• BEARING, RETENTION, BLADE		1		
1050	A-2202-B	• • RACE, BLADE SIDE		1		
1060	B-6144	• • BALL, BEARING, 1/2 INCH DIA.		25	Y	
	B-6144-650	• • BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• • RACE, HUB SIDE		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3, CONTINUED				
10-66		**BLADE RETENTION PARTS, CONTINUED** **All quantities (UPA) in this parts list are per blade assembly.**				
1080	B-3211	• BALL SPACER		1	Y	
1090	C-3317-340	• O-RING (BLADE MOUNTING) SUPERSEDED BY ITEM 1090A		1	Y	
1090A	C-3317-340-8	• O-RING (BLADE MOUNTING) SUPERSEDES ITEM 1090, POST HC-SL-61-301	E	1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

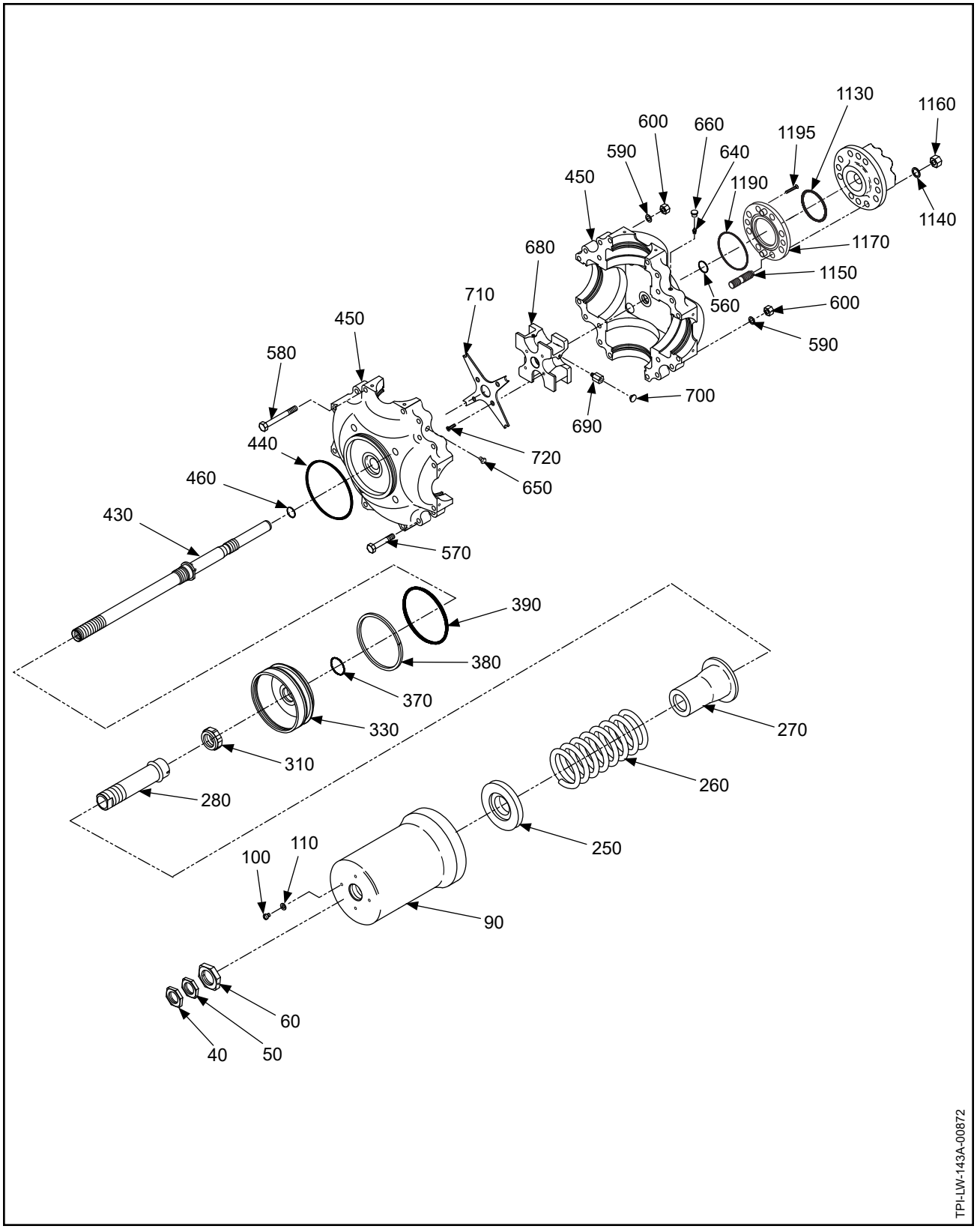
- ITEM NOT ILLUSTRATED

HC-E4W-3

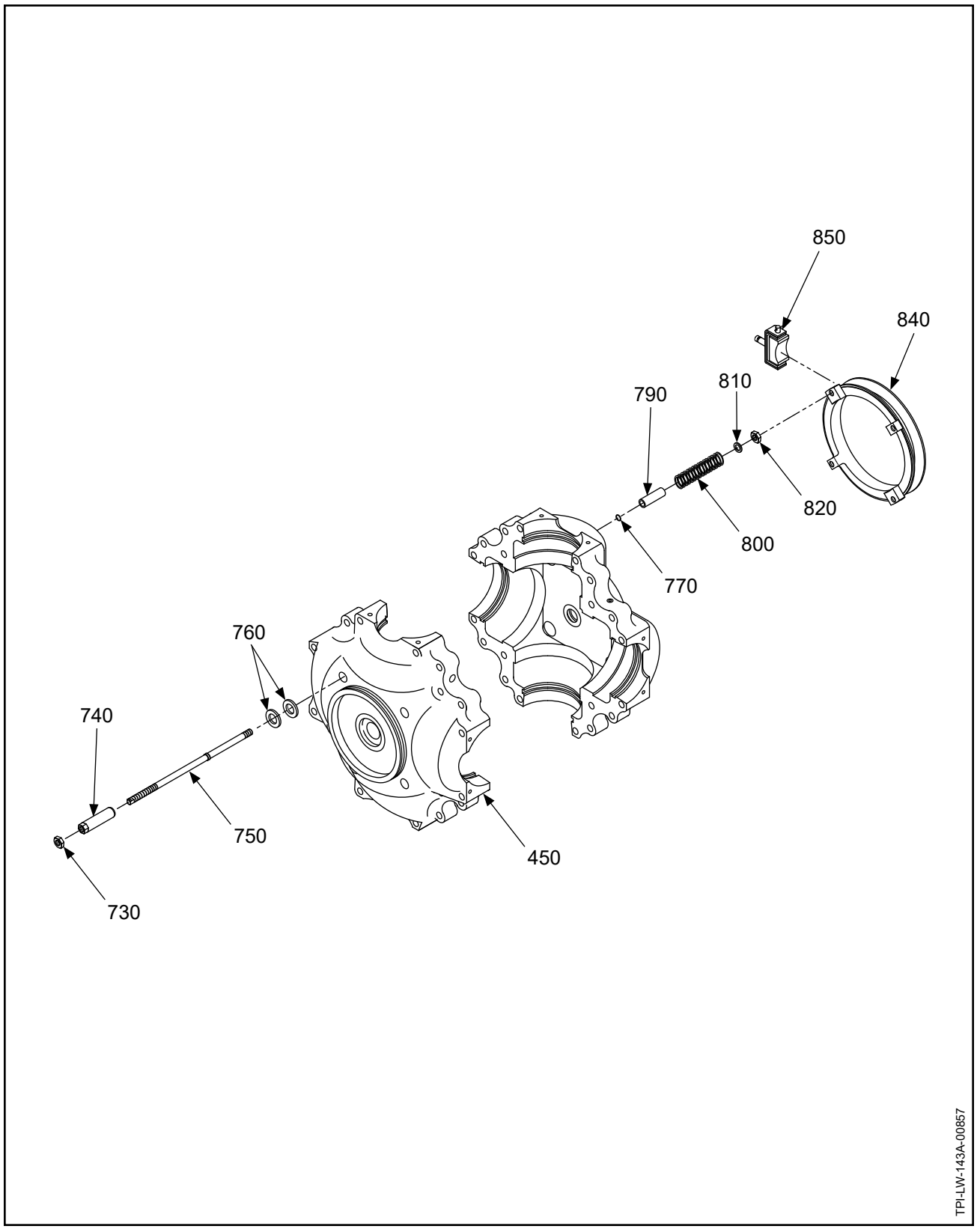
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-64		PROPELLER ASSEMBLY PARTS - HC-E4W-3, CONTINUED				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	B-7624	• WASHER, MOUNTING, 9/16		8	Y	
1150	A-3254	• STUDS, MOUNTING		8	Y	
1160	B-7458	• NUT, 9/16-18 HEX, SELF-LOCKING		8	Y	
1170	C-7620	• SPACER, MOUNTING		1		
-1180	B-6138-8-6	• • DOWEL PIN		2		
1190	C-3317-233	• O-RING		1	Y	
1195	B-3868-S52	• SCREW, 8-32, 100 DEGREE HEAD		1	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

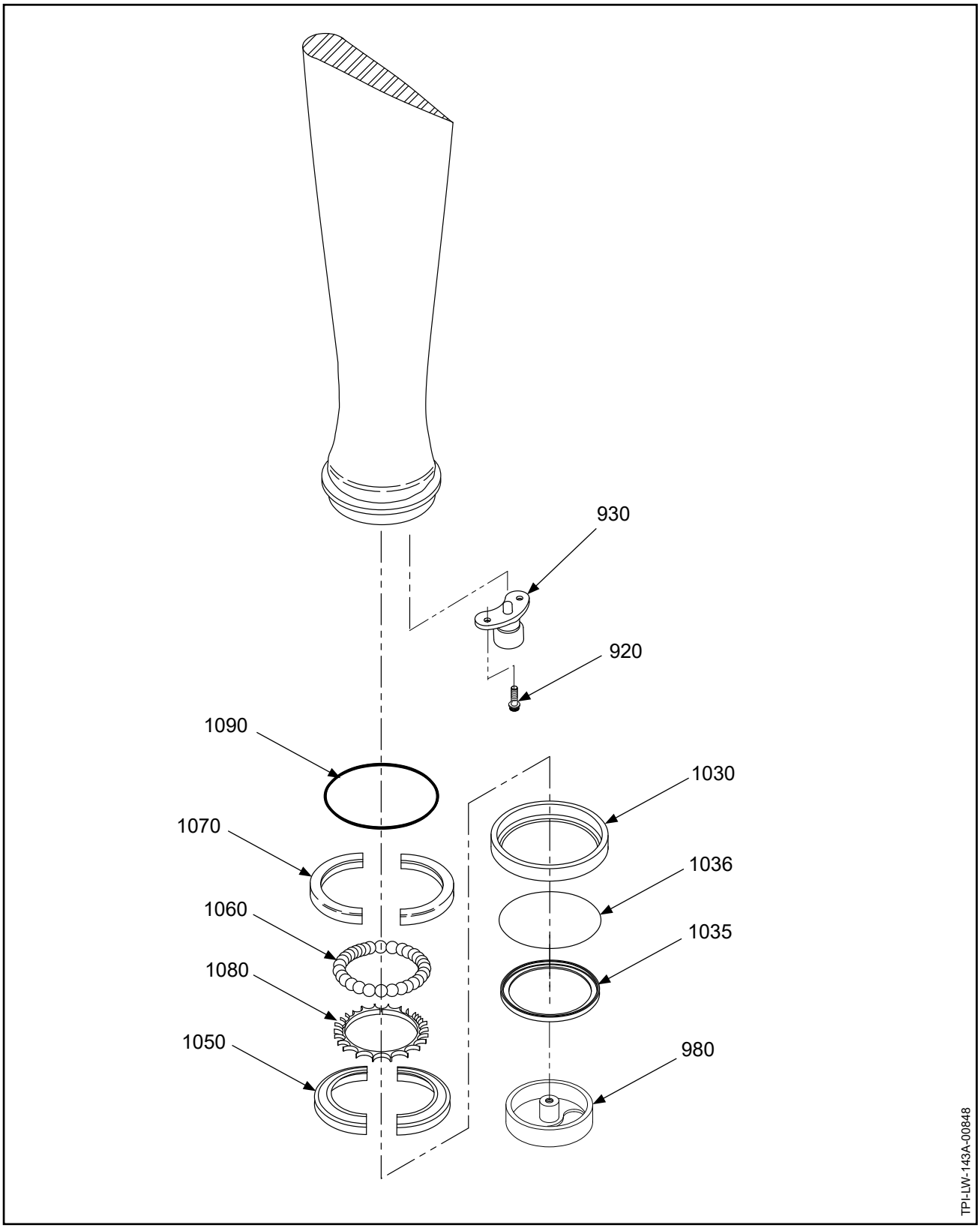
- ITEM NOT ILLUSTRATED



HC-E4W-3A: Propeller Parts
Figure 10-67



HC-E4W-3A: Beta System Parts
Figure 10-68



HC-E4W-3A: Blade Retention Parts
Figure 10-69

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-67		**PROPELLER ASSEMBLY PARTS - HC-E4W-3A**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-290	C-6759	• • PCP: SLEEVE, REVERSE ADJUST ONLY AVAILABLE AS PART OF ITEM 280		1		PCP
-300	A-441	• • BUSHING, SLEEVE		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
-360	B-3842-0500	• SPRING PIN, 3/32 INCH, CRES		8	Y	
370	C-3317-217	• O-RING (PISTON ID)		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING (PISTON OD)		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING (CYLINDER MOUNTING)		1	Y	
460	C-3317-213-2	• O-RING		1	Y	
450	E-7619	• PCP: HUB UNIT, HC-E4W-3( ) (REFER TO “E-7619 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-2, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-2, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-67		**PROPELLER ASSEMBLY PARTS - HC-E4W-3A, CONTINUED**				
640	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 640A AND 650		8	Y	
640A	A-279	• FITTING, LUBRICATION REPLACES ITEM 640 IN ENGINE-SIDE OF HUB		4	Y	
640B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 640A		4	Y	
650	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 640 IN CYLINDER-SIDE OF HUB		4	Y	
660	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 640, 640A, AND 640B		4	Y	
-670	C-633	• FORK, FOUR BLADE - ASSEMBLY, SUPERSEDED BY ITEM 670A		1		
680	D-495	• • FORK, FOUR BLADE SUPERSEDED BY ITEM 680A		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	B-462	• • BETA PICKUP, USE ONLY WITH ITEM 670		4		
720	B-3824	• • SCREW, 8-32, 100° HEAD, USE ONLY WITH ITEM 670		8	Y	
-670A	C-6568	• FORK, FOUR BLADE - ASSEMBLY, SUPERSEDES ITEM 670		1		
680A	D-495-2	• • FORK, FOUR BLADE, SUPERSEDES ITEM 680		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK		4	Y	
710	C-6475	• • PLATE, BETA PICKUP, USE ONLY WITH ITEM 670A		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD, USE ONLY WITH ITEM 670A		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3A, CONTINUED				
10-68		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	C-452	• BETA RING		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3A, CONTINUED				
10-69		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEMS 930 AND 930A		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930B		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930A (REFER TO "100028-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO "108303-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	100641	• PRELOAD PLATE ASSEMBLY (REFER TO "100641-( ) PRELOAD PLATE ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	B-7071	• RING, RETAINING, BEARING		1		
1035	B-7726	• BLADE SEAL		1		
1036	C-3317-045	• O-RING		1	Y	
-1040	C-792	• BEARING, RETENTION, BLADE		1		
1050	C-792-B	• • RACE, BLADE SIDE		1		
1060	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1070	C-792-A	• • RACE, HUB SIDE		1		
1080	B-793	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	

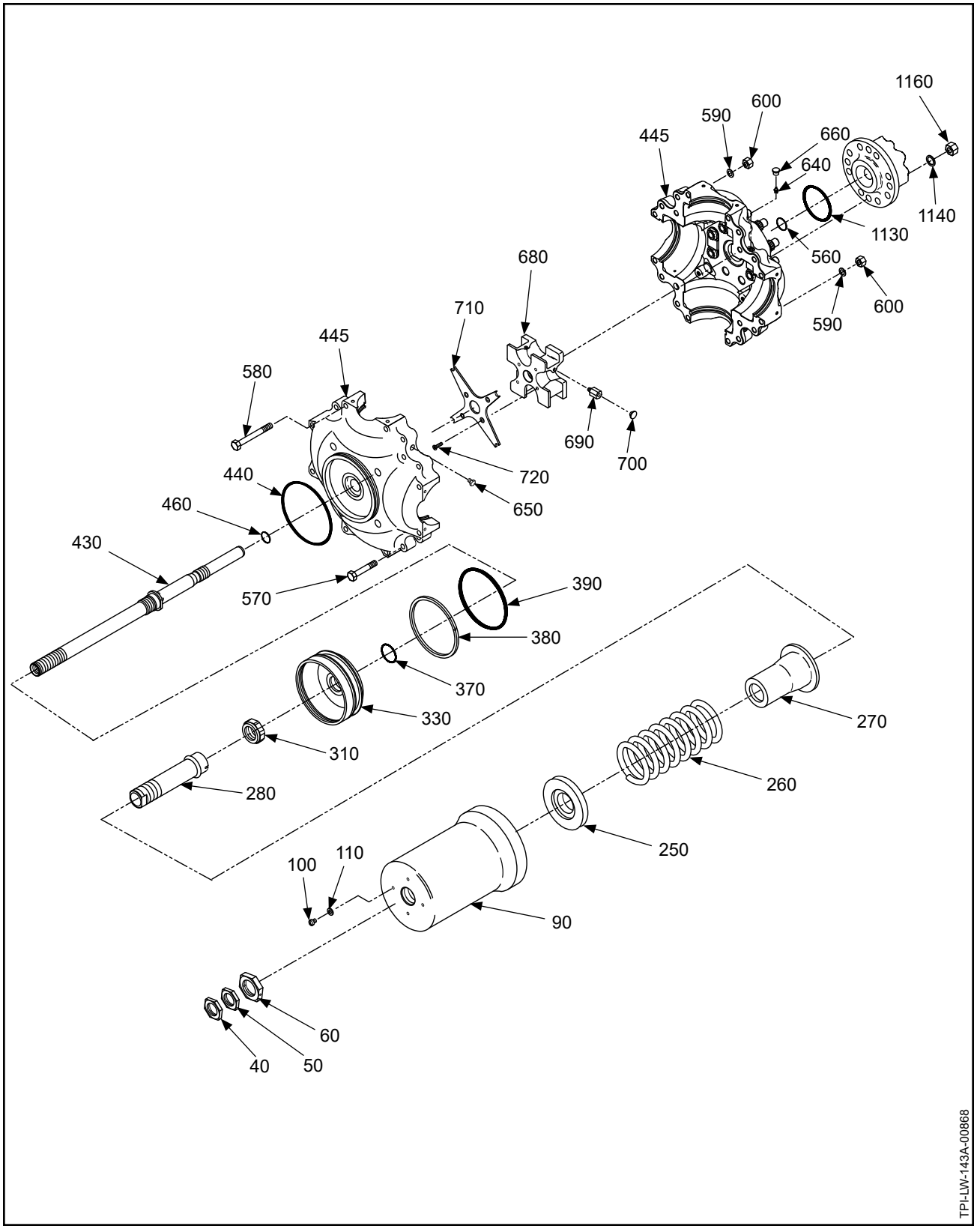
EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

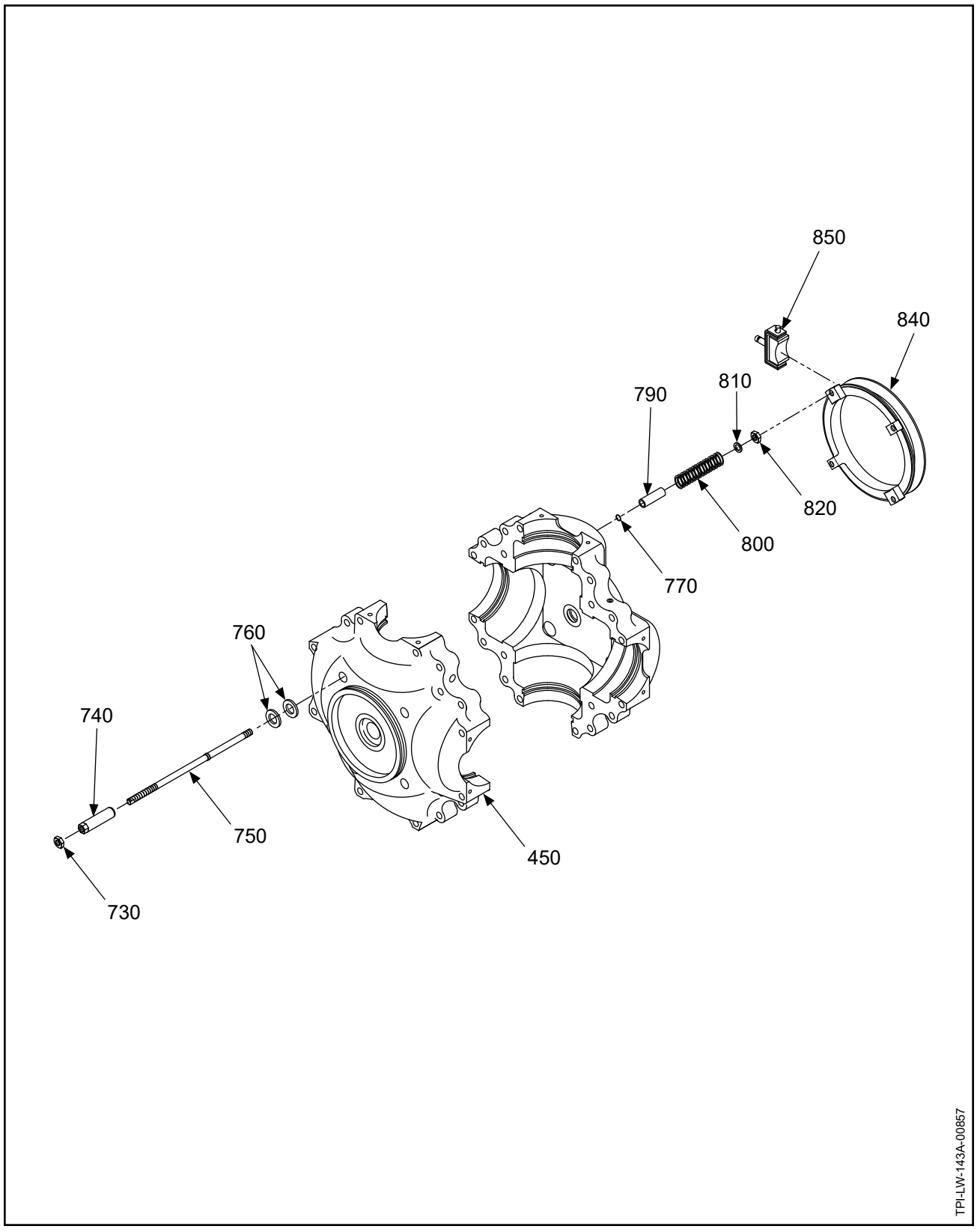
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-67		**PROPELLER ASSEMBLY PARTS - HC-E4W-3A, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	B-7624	• WASHER, MOUNTING, 9/16		8	Y	
1150	A-3254	• STUDS, MOUNTING		8	Y	
1160	B-7458	• NUT, 9/16-18 HEX, SELF-LOCKING		8	Y	
1170	C-7620	• SPACER, MOUNTING		1		
-1180	B-6138-8-6	• • DOWEL PIN		2		
1190	C-3317-233	• O-RING		1	Y	
1195	B-3868-S52	• SCREW, 8-32, 100 DEGREE HEAD		2	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

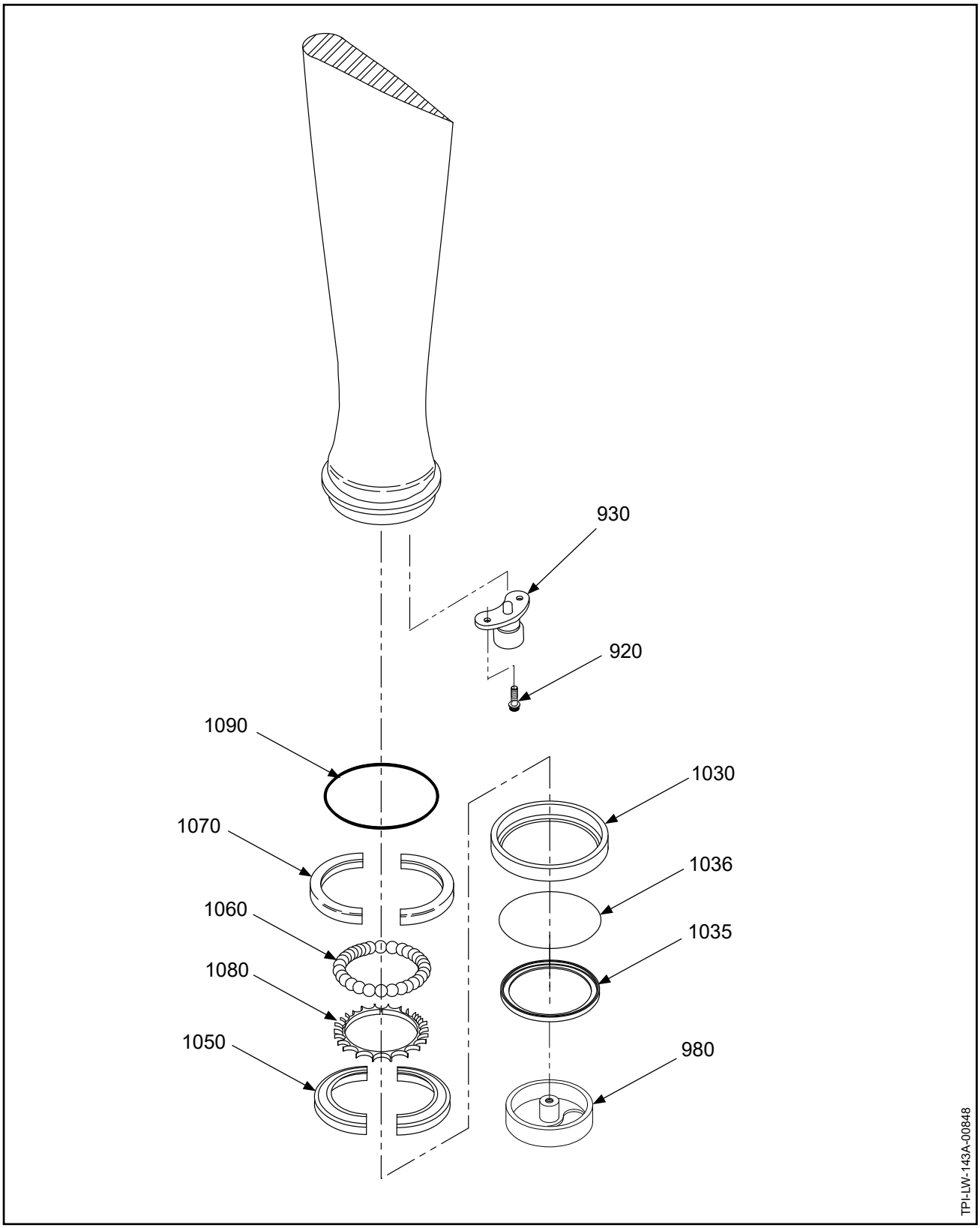
- ITEM NOT ILLUSTRATED



HC-E4W-3KD: Propeller Parts
Figure 10-70



HC-E4W-3KD: Beta System Parts
Figure 10-71



HC-E4W-3KD: Blade Retention Parts
Figure 10-72

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-70		**PROPELLER ASSEMBLY PARTS - HC-E4W-3KD**				
40	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
50	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED		1		PCP
60	B-3375	• PCP: NUT, 1 3/8-12, HEX, THIN, DRILLED		1		PCP
90	D-488	• PCP: CYLINDER		1		PCP
100	B-3841-5	• SCREW, 1/4-28 SCREW, FILLISTER HEAD		1	Y	
110	B-3837-0463	• WASHER, CORROSION RESISTANT		1	Y	
250	B-6768	• SPRING RETAINER, FOWARD		1		
260	C-6760	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
270	B-6761	• GUIDE, SPRING, PLASTIC		1	Y	
280	B-6758	• PCP: SLEEVE, PITCH ADJUST - UNIT		1		PCP
-300	A-441	• • BUSHING, SLEEVE ONLY AVAILABLE AS PART OF ITEM 280		1		
310	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING		1	Y	
330	C-492	• PISTON		1		
370	C-3317-217	• O-RING, PISTON ID		1	Y	
380	B-1843	• SEAL, DUST, PISTON		1	Y	
390	C-3317-426-2	• O-RING, PISTON OD		1	Y	
430	D-6506	• PCP: ROD, PITCH CHANGE		1		PCP
440	C-3317-251	• O-RING, CYLINDER MOUNTING		1	Y	
460	C-3317-213-2	• O-RING, CYLINDER-SIDE BUSHING ID		1	Y	
-445	107222	• PCP: HUB - ASSEMBLY, HC-E4(N,P,W)-3K( ) (REFER TO “107222 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
560	C-3317-211-2	• O-RING (ENGINE-SIDE BUSHING ID)		1	Y	
570	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
580	A-2432	• BOLT, 3/8-24, HEX HEAD		8		
590	B-3834-0632	• WASHER		20	Y	
600	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		20	Y	
640	C-6349	• FITTING, LUBRICATION, 45° (ENGINE-SIDE OF HUB)		2	Y	
650	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		2	Y	
660	B-6544	• CAP, FITTING, LUBRICATION, USED WITH ITEM 640		2	Y	
-670	C-6568	• FORK, FOUR BLADE - ASSEMBLY		1		
680	D-495-2	• • FORK, FOUR BLADE		1		
690	B-468	• • EXTENSION, BUMPER		4		
700	A-3256	• • BUMPER, FORK			4	Y
710	C-6475	• • PLATE, BETA PICKUP		1		
720	B-6521-8	• • SCREW, 10-32, 100° HEAD		4	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3KD, CONTINUED				
10-71		**BETA SYSTEM PARTS**				
730	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
740	B-457	• SLEEVE, BETA, THREADED		4		
750	C-453	• ROD, BETA		4		
760	A-3623	• RING, BACKUP		8	Y	
770	C-3317-011	• O-RING, RETAINER		4	Y	
790	A-466	• SLEEVE, GUIDE, SPRING		4	Y	
800	B-458	• SPRING, COMPRESSION, BETA		4	Y	
810	B-3851-0532	• WASHER		4	Y	
820	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED		4	Y	PCP
840	107255	• RING, BETA		1		
850	A-3044	• BLOCK, BETA FEEDBACK-ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		PROPELLER ASSEMBLY PARTS - HC-E4W-3KD, CONTINUED				
10-72		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
920	B-3825	• SCREW, 1/4-28, 100° HEAD, REPLACED BY ITEM 920A USED ONLY WITH ITEM 930		2	Y	
920A	108142	• BOLT, 1/4-28, 12-POINT, REPLACES ITEM 920 POST HC-SB-61-389, R1, USED ONLY WITH ITEM 930A		2	Y	
-925	102632	• TUBING, SILICONE, USE WITH ITEM 920A BOLT ONLY		1	Y	
930	100028-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 930A (REFER TO “100028-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
930A	108303-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO “108303-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
980	101004	• PRELOAD PLATE ASSEMBLY (REFER TO “101004 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1030	102158	• RING, RETAINING, BEARING		1		
1035	B-7726	• SEAL, BLADE, OPTIONAL, USED WITH ITEM 1030		1		
1036	C-3317-045	• O-RING, OPTIONAL, USED WITH ITEM 1030		1	Y	
1050	A-2202-B	• RACE, BLADE SIDE		1		
1060	B-6144	• BALL, BEARING, 1/2 INCH DIA.		100	Y	
	B-6144-650	• BALL, BEARING, 1/2 INCH DIA. (BOX OF 650)		RF		
1070	A-2202-A	• RACE, HUB SIDE		1		
1080	B-3211	• BALL SPACER		1	Y	
1090	C-3317-340-8	• O-RING (BLADE MOUNTING)	E	1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
E	BLADES MUST HAVE 0.010 INCH (0.25 mm) THICK CM155 TEFLON® TAPE INSTALLED IN ACCORDANCE WITH HARTZELL ALUMINUM BLADE MANUAL 133C (61-13-33)		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-70		**PROPELLER ASSEMBLY PARTS - HC-E4W-3KD, CONTINUED**				
		BALANCE PARTS				
-1110	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1120	A-2424( )	• BALANCE WEIGHT		AR		
		PROPELLER MOUNTING PARTS				
1130	C-3317-230	• O-RING (FLANGE)		1	Y	
1140	B-7624	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1160	B-7458	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		COUNTERWEIGHTS/MOUNTING BOLTS				
-9070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-9050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

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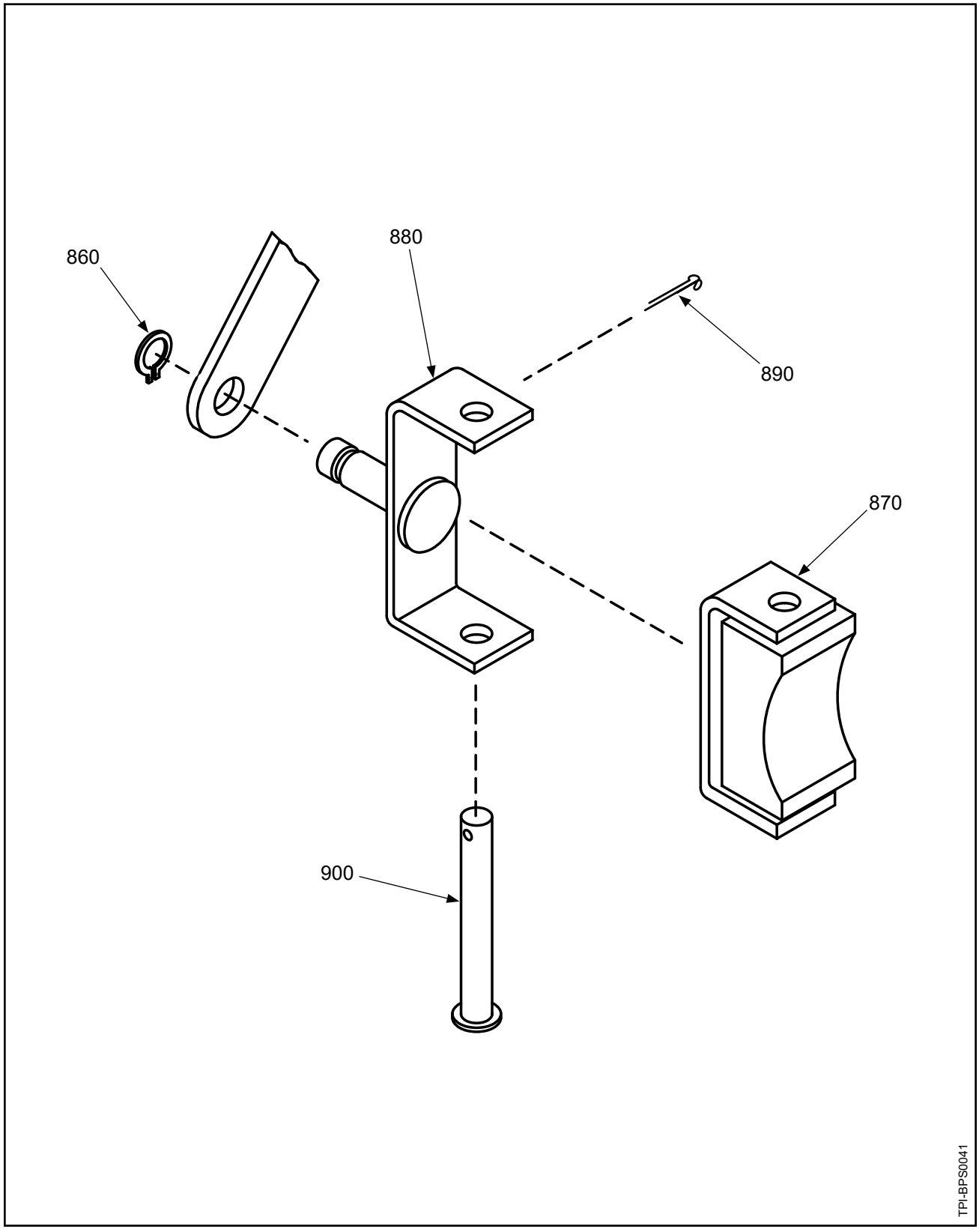
SUB-ASSEMBLY
PARTS LISTS and FIGURES



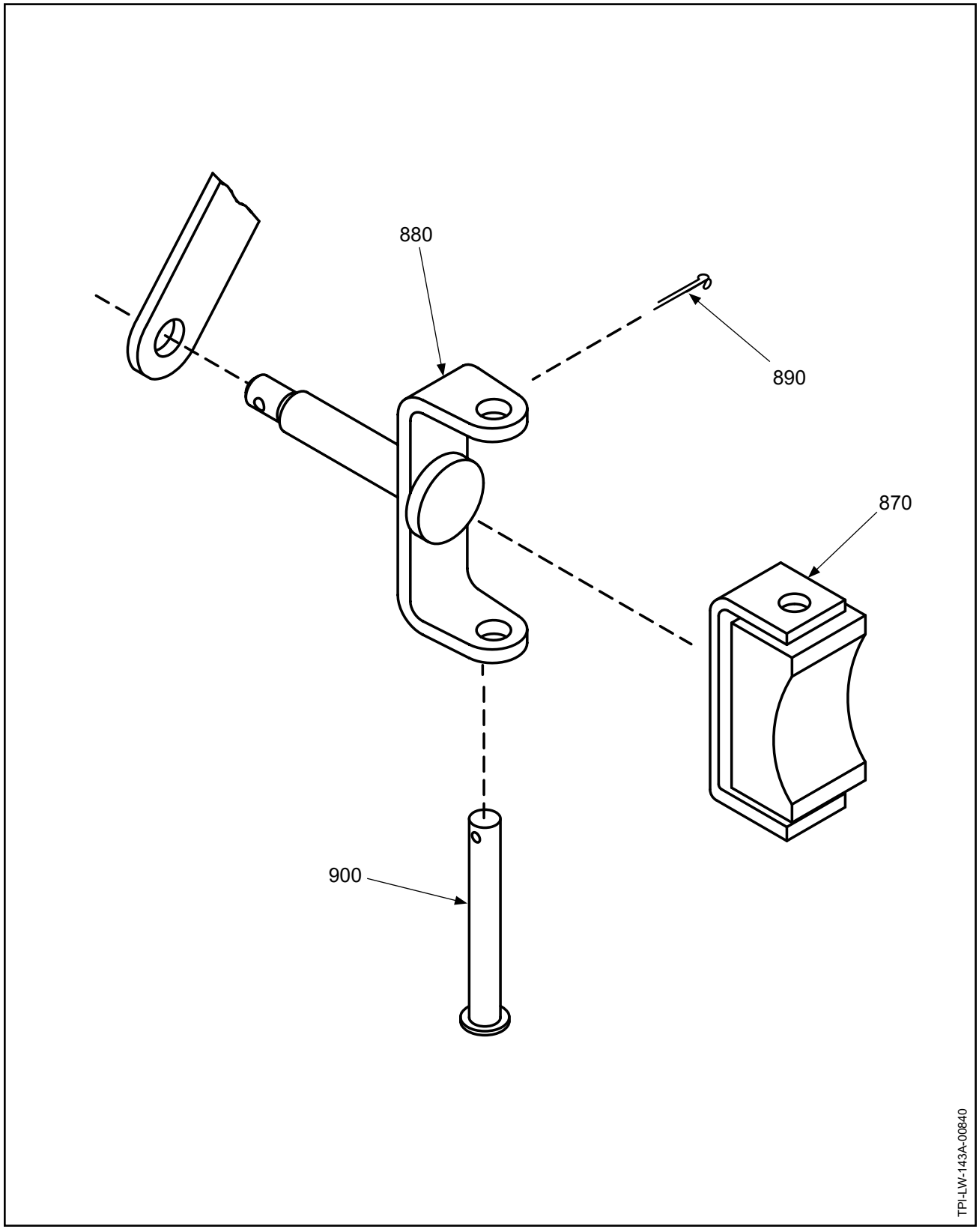
A-3044: Beta Feedback Block Assembly
Figure 10A-1

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-1		**A-3044: BETA FEEDBACK BLOCK ASSEMBLY**				
-850	A-3044	BETA FEEDBACK BLOCK ASSEMBLY		1		
860	B-3843-25PP	• SNAP RING, EXTERNAL		1	Y	
870	A-3026	• CARBON BLOCK - UNIT		1	Y	
880	A-3025	• YOKE UNIT		1		
890	A-4543	• COTTER PIN, T HEAD		1	Y	
900	B-3844	• CLEVIS PIN, REPLACED BY ITEM 900A		1	Y	
900A	B-3844-53	• CLEVIS PIN, REPLACES ITEM 900		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

A-3044: Beta Feedback Block Assembly



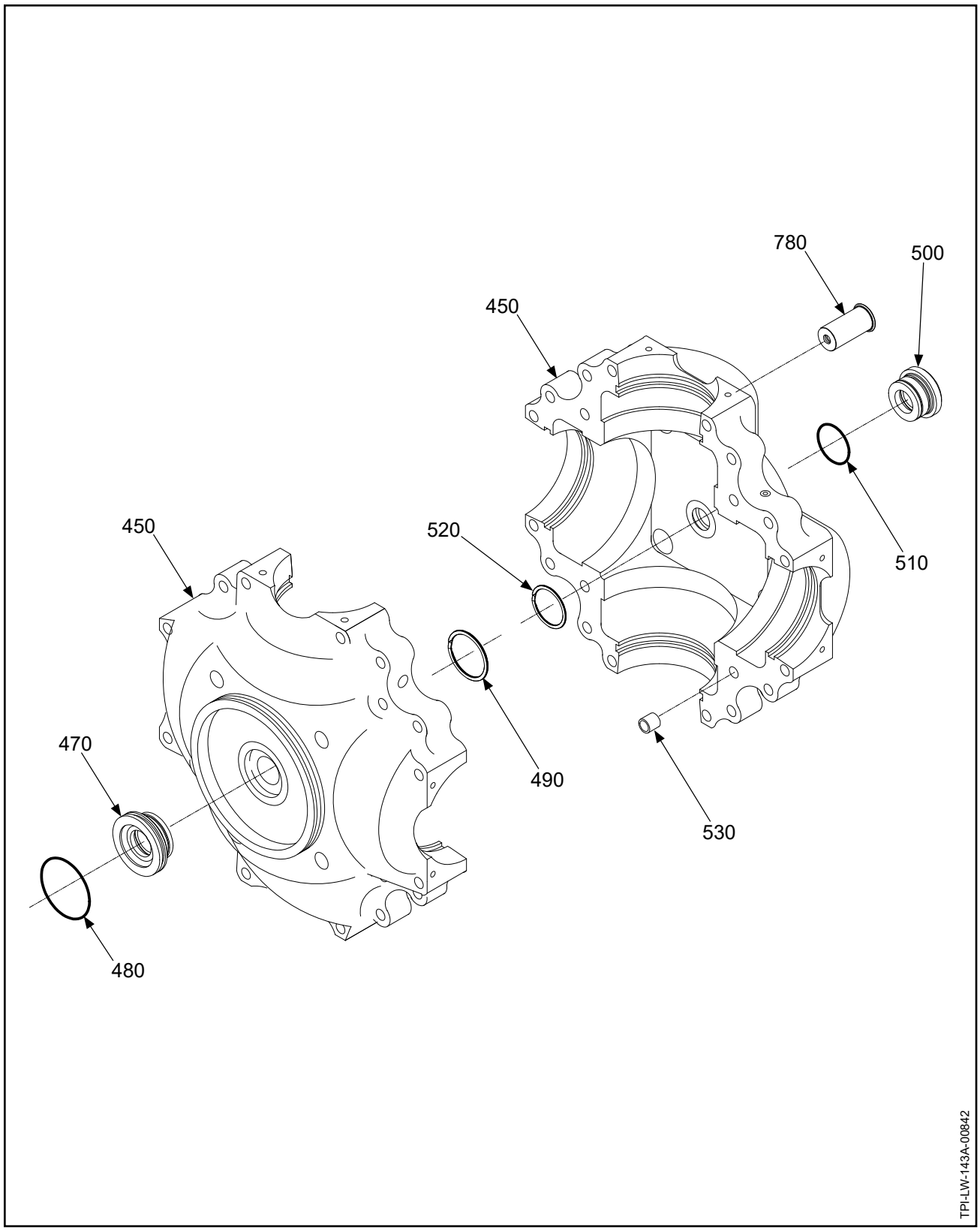
A-3074: Beta Feedback Block Assembly
Figure 10A-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-2		**A-3074: BETA FEEDBACK BLOCK ASSEMBLY**				
-850	A-3074	BLOCK, BETA FEEDBACK- ASSEMBLY		1		
870	A-3026	• CARBON BLOCK - UNIT		1	Y	
880	A-3073	• YOKE UNIT		1		
890	A-4543	• COTTER PIN, T HEAD		1	Y	
900	B-3844-53	• CLEVIS PIN		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

A-3074: Beta Feedback Block Assembly

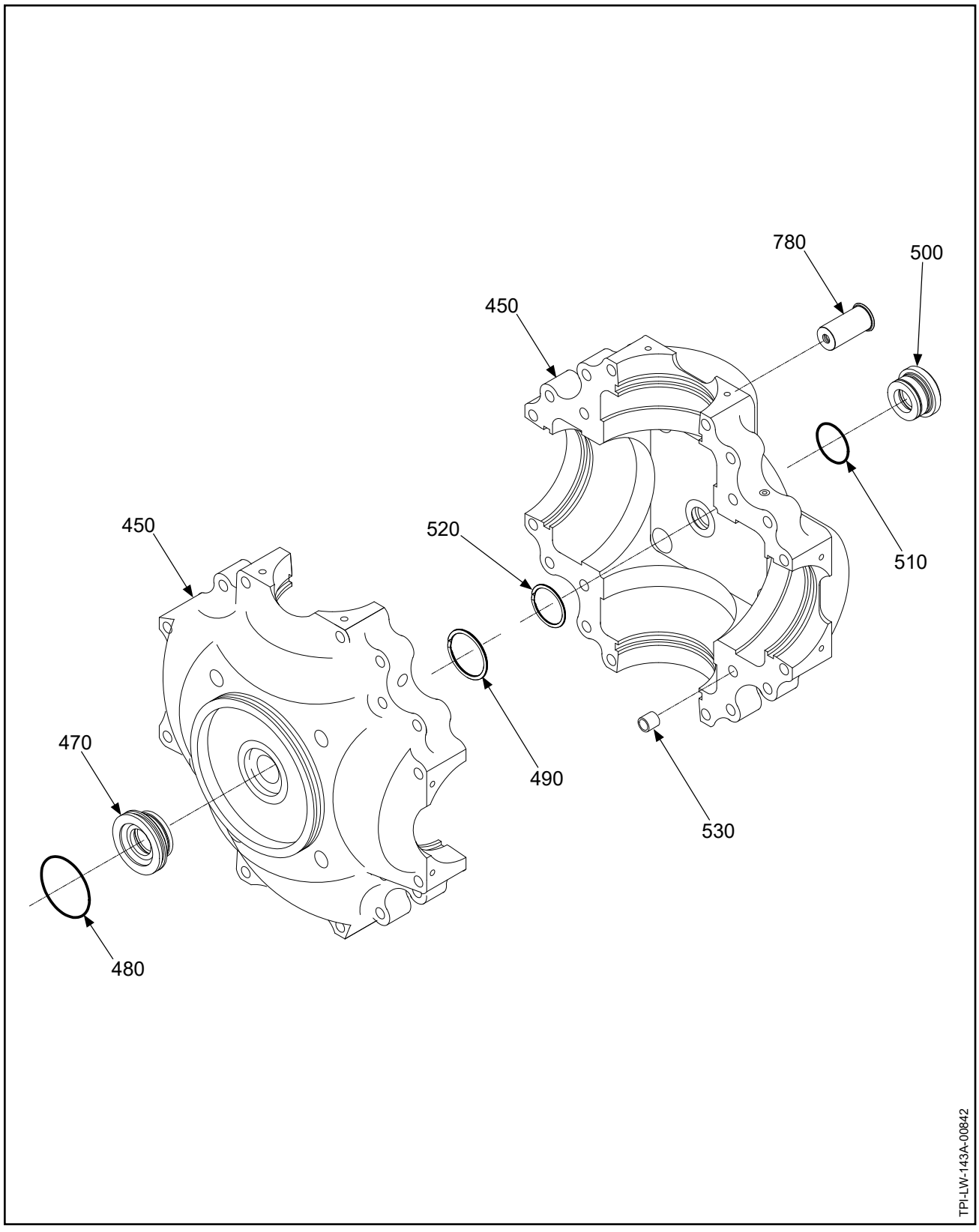


D-499-( ): Hub Unit
Figure 10A-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-3		**D-499-( ): HUB UNIT PARTS**				
450	D-499-( )	PCP:HUB UNIT, HC-D4(N,P)-3		1		PCP
470	B-5952	• HUB BUSHING, ROD		1		
480	C-3317-135-2	• O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• HUB BUSHING, ROD		1		
510	C-3317-026-2	• O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• INSERT, 1/4-28, CRES, COILED		8	Y	
-550	B-1243	• INSERT, 9/16-18, CRES, STAKED		8	Y	
780	B-454	• SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED



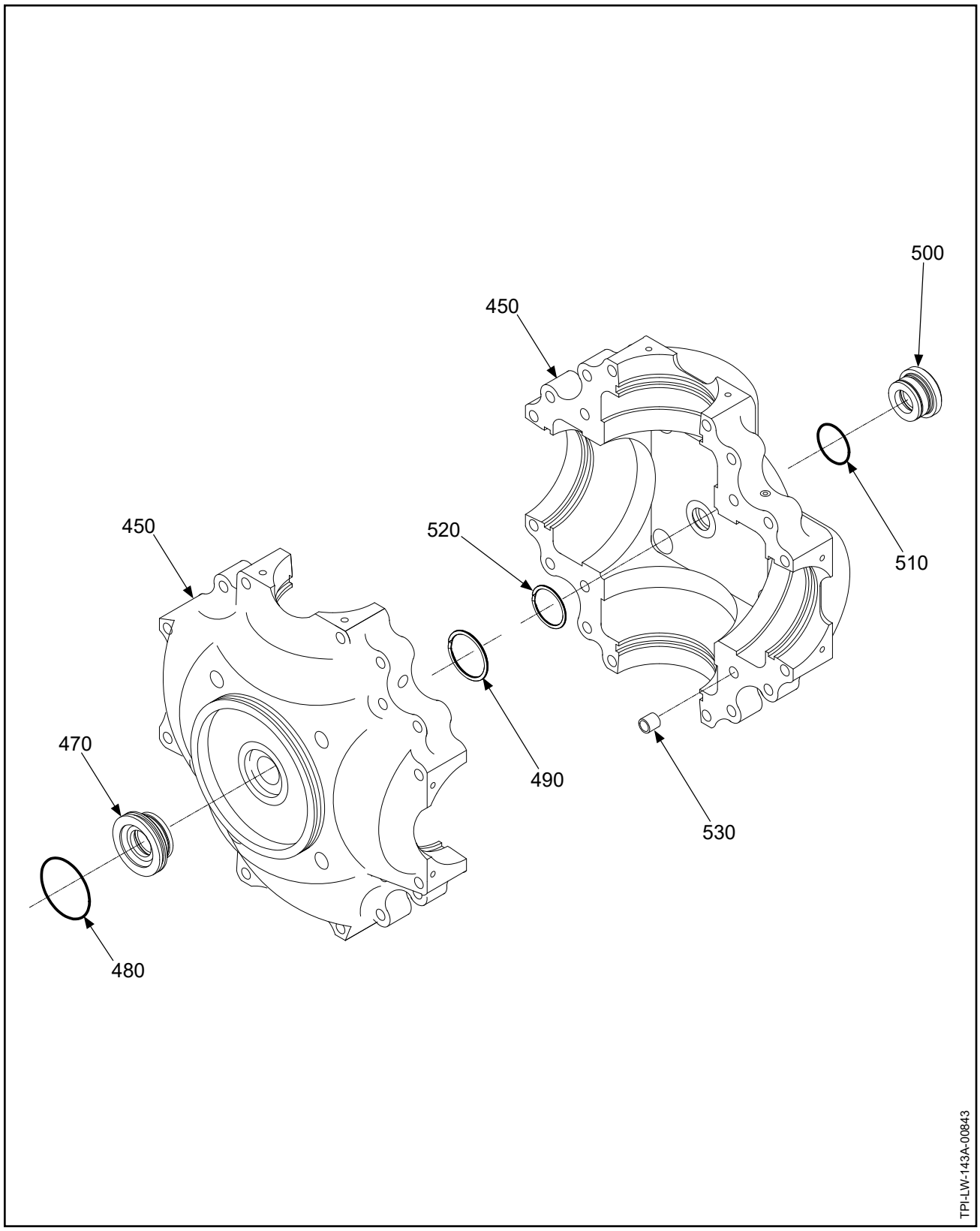
D-5126-( ): Hub Unit
Figure 10A-4

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-4		**D-5126-( ): HUB UNIT PARTS**				
450	D-5126-( )	PCP:HUB UNIT, HC-E4(N,P)-3( )		1		PCP
470	B-5952	• HUB BUSHING, ROD		1		
480	C-3317-135-2	• O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• HUB BUSHING, ROD		1		
510	C-3317-026-2	• O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• INSERT, 1/4-28, CRES, COILED		8	Y	
-550	B-1243	• INSERT, 9/16-18, CRES, STAKED		12	Y	
780	B-454	• SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

D-5126-( ): Hub Unit



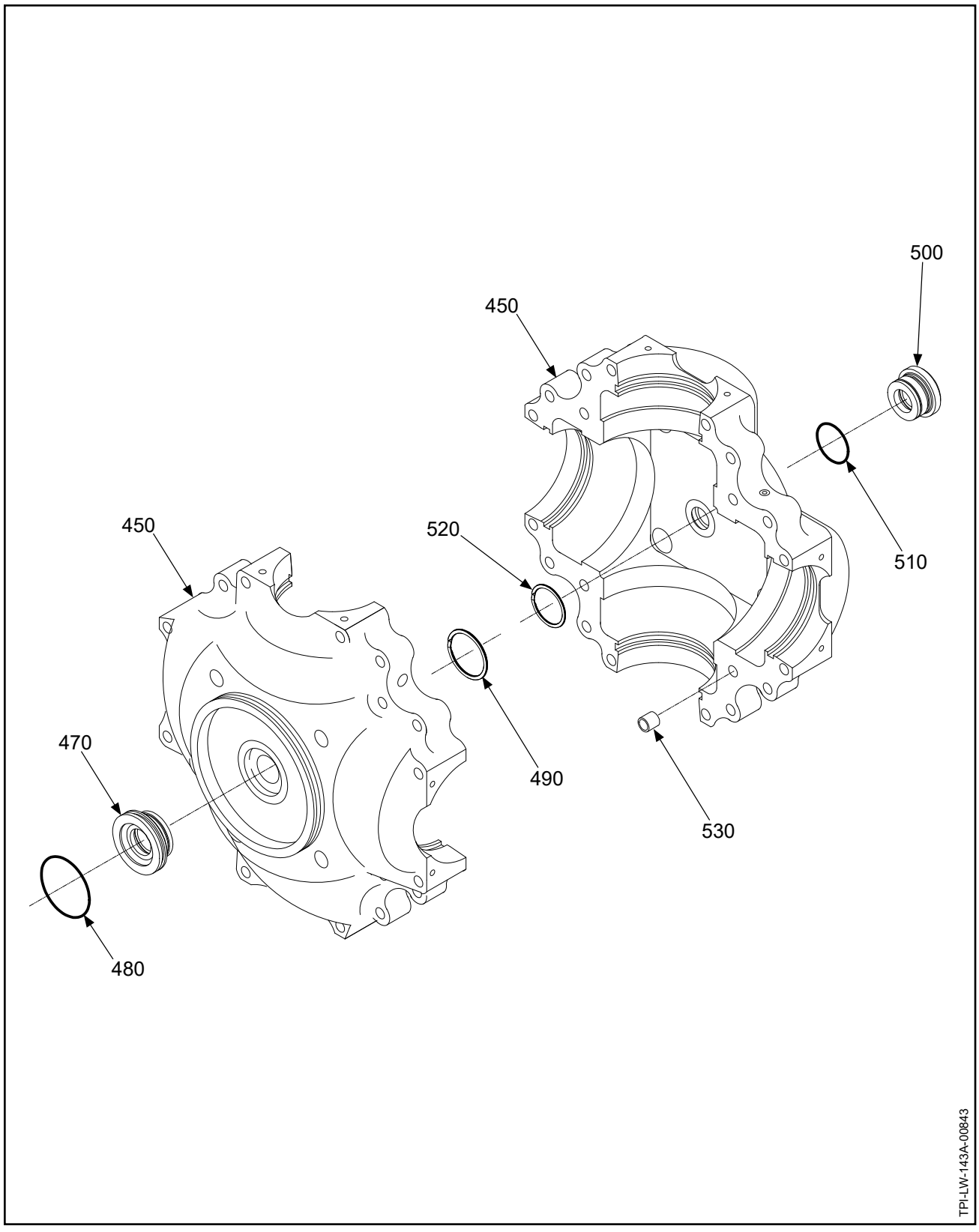
E-393-( ): Hub Unit
Figure 10A-5

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-5		**E-393-( ): HUB UNIT PARTS**				
450	E-393-( )	PCP:HUB UNIT, HC-E4A-3( )		1		PCP
470	B-5952	• HUB BUSHING, ROD		1		
480	C-3317-135-2	• O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• HUB BUSHING, ROD		1		
510	C-3317-026-2	• O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• INSERT, 1/4-28, CRES, COILED		8	Y	
-550	B-1243	• INSERT, 9/16-18, CRES, STAKED		12	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

E-393-( ): Hub Unit



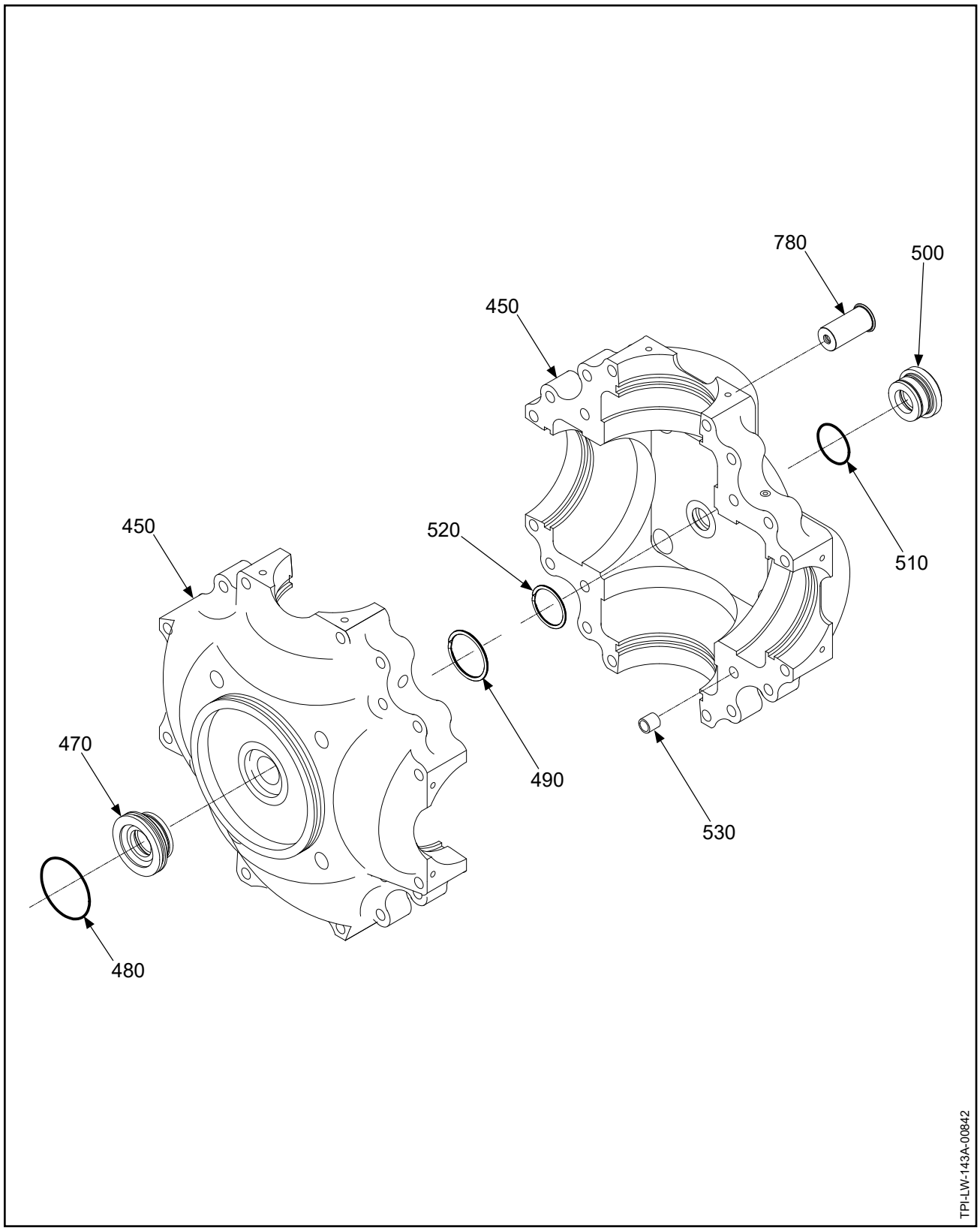
E-6826: Hub Unit
Figure 10A-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-6		**E-6826: HUB UNIT PARTS**				
450	E-6826	PCP: HUB UNIT, HC-E4A-3		1		PCP
470	B-5952	• HUB BUSHING, ROD		1		
480	C-3317-135-2	• O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• HUB BUSHING, ROD		1		
510	C-3317-026-2	• O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• INSERT, 1/4-28, CRES, COILED		8	Y	
-550	B-1243	• INSERT, 9/16-18, CRES, STAKED		12	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

E-6826: Hub Unit



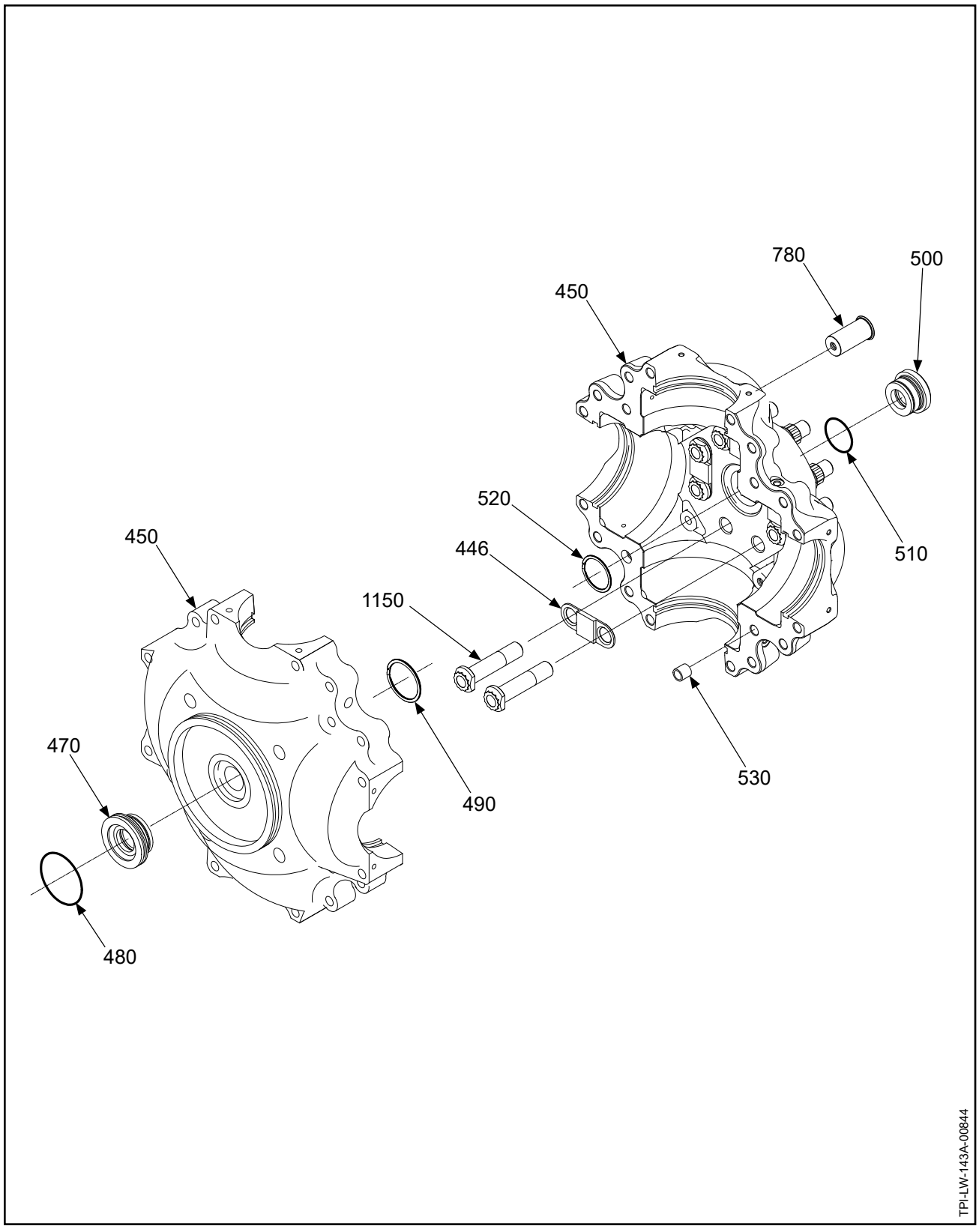
E-7619: Hub Unit
Figure 10A-7

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-7		**E-7619: HUB UNIT PARTS**				
450	E-7619	PCP: HUB UNIT, HC-E4W-3( )		1		PCP
470	B-5952	• HUB BUSHING, ROD		1		
480	C-3317-135-2	• O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• HUB BUSHING, ROD		1		
510	C-3317-026-2	• O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• INSERT, 9/16-18, CRES, COILED		8	Y	
-550	100128	• INSERT, 9/16-18, CRES, NON-STAKED		8	Y	
780	B-454	• SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

E-7619: Hub Unit



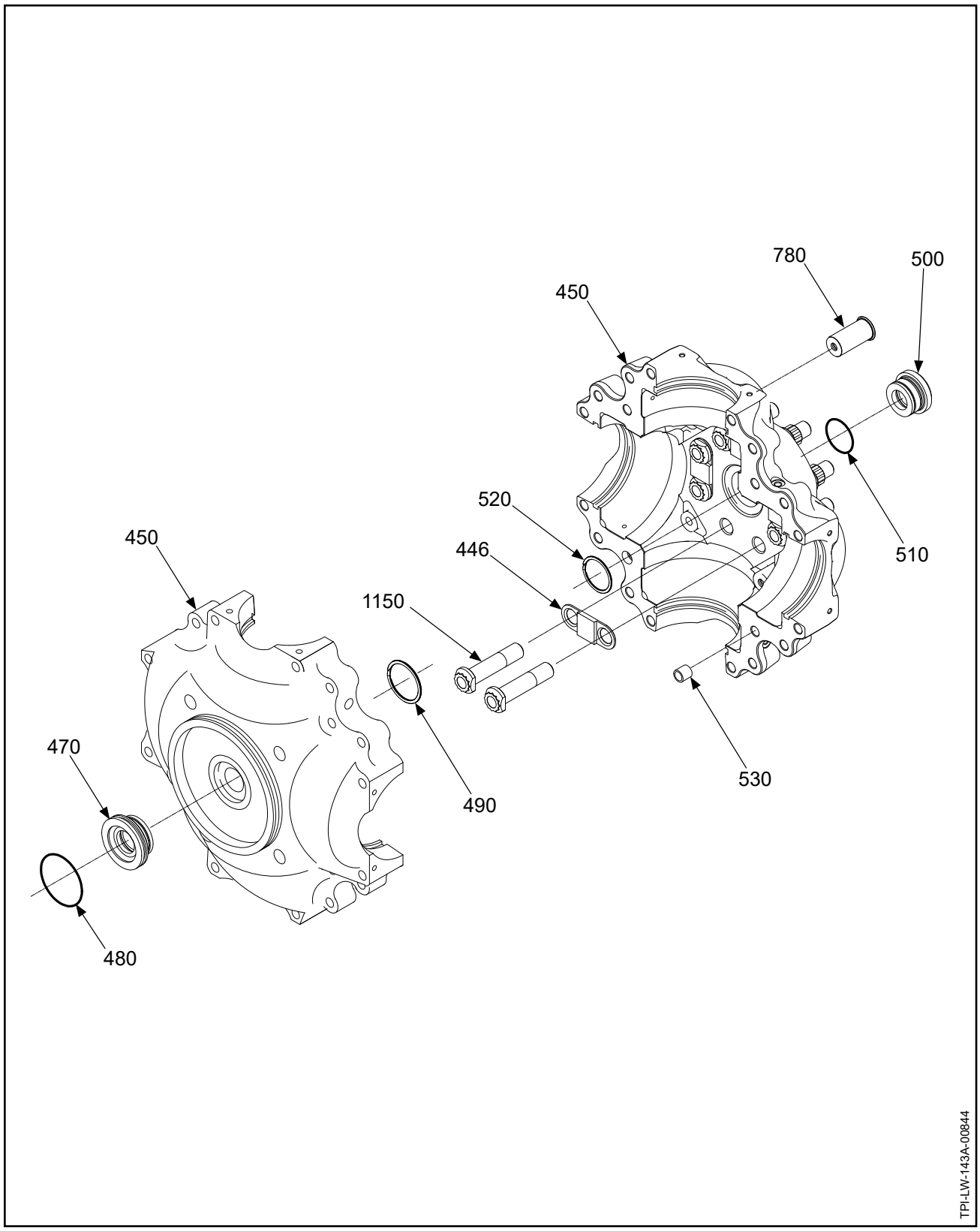
103748: Hub Assembly
Figure 10A-8

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-8		**103748: HUB ASSEMBLY PARTS**				
-445	103748	PCP: HUB ASSEMBLY, HC-E4(N,P,W)-3K( )		1		PCP
446	103419	• PLATE, HUB MOUNTING		4		
1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
450	103559	• PCP: HUB UNIT, HC-E4(N,P)-3K( )		1		PCP
470	B-5952	• • HUB BUSHING, ROD		1		
480	C-3317-135-2	• • O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• • RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• • HUB BUSHING, ROD		1		
510	C-3317-026-2	• • O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• • RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• • HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• • INSERT, 1/4-28, CRES, COILED		8	Y	
780	B-454	• • SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

103748: Hub Assembly



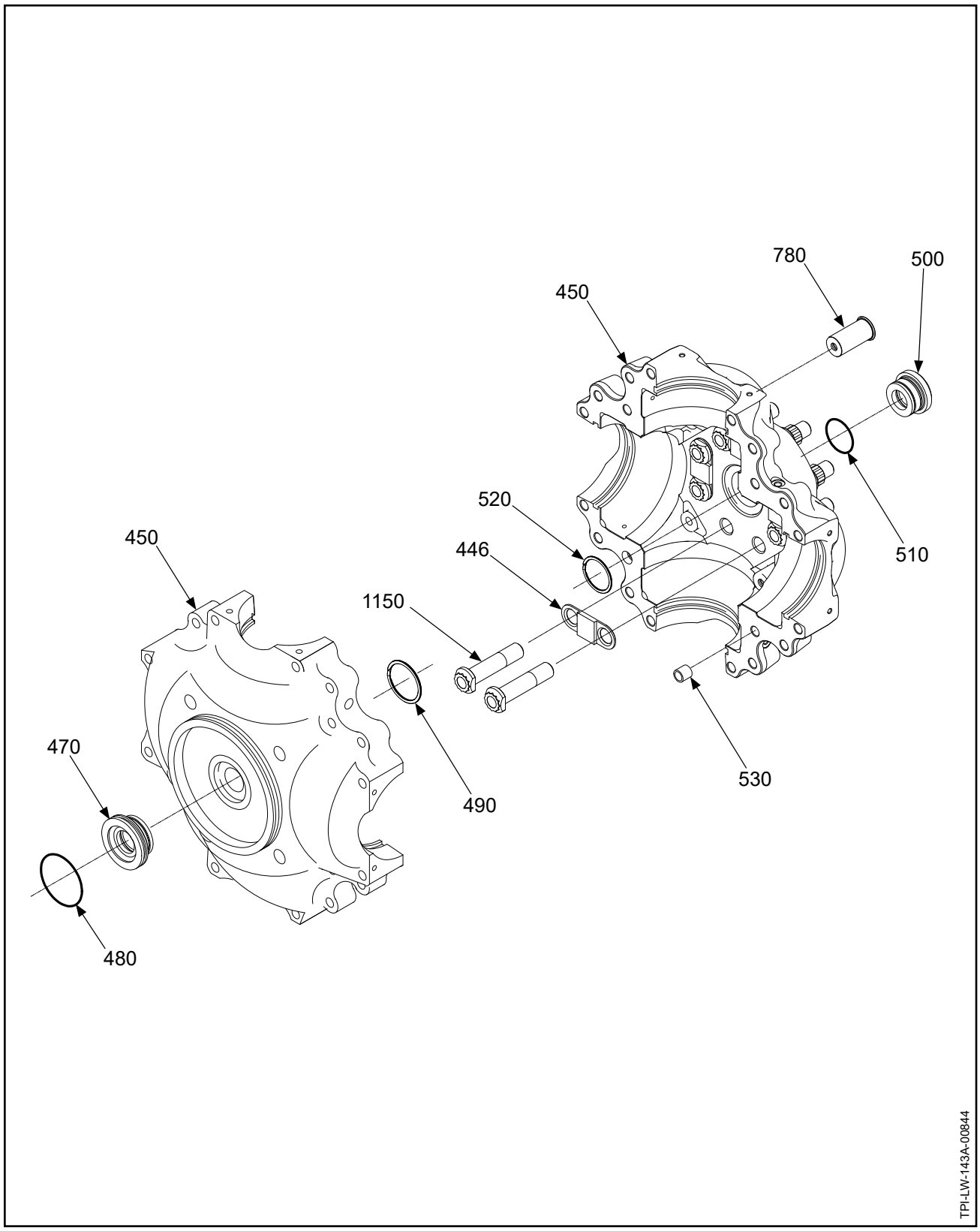
107222-( ): Hub Assembly
Figure 10A-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-9		**107222-( ): HUB ASSEMBLY PARTS**				
		107222: HUB ASSEMBLY PARTS				
-445	107222	PCP:HUB ASSEMBLY, HC-E4(N,P,W)-3K( )		1		PCP
446	103419	• PLATE, HUB MOUNTING		4		
1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
450	107210	• PCP:HUB UNIT, HC-E4(N,P,W)-3K		1		PCP
470	B-5952	• • HUB BUSHING, ROD		1		
480	C-3317-135-2	• • O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• • RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• • HUB BUSHING, ROD		1		
510	C-3317-026-2	• • O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• • RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• • HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• • INSERT, 1/4-28, CRES, COILED		8	Y	
780	B-454	• • SPRING RETAINER, BETA		4		
		107222-1: HUB ASSEMBLY PARTS				
-445	107222-1	PCP:HUB ASSEMBLY, HC-E4N-3KU		1		PCP
446	103419	• PLATE, HUB MOUNTING		4		
1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
450	107210-1	• PCP:HUB UNIT, HC-E4N-3KU		1		PCP
470	B-5952-4	• • HUB BUSHING, ROD		1		
480	C-3317-135-2	• • O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• • RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• • HUB BUSHING, ROD		1		
510	C-3317-026-2	• • O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• • RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• • HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• • INSERT, 1/4-28, CRES, COILED		8	Y	
780	B-454	• • SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

107222-( ): Hub Assembly



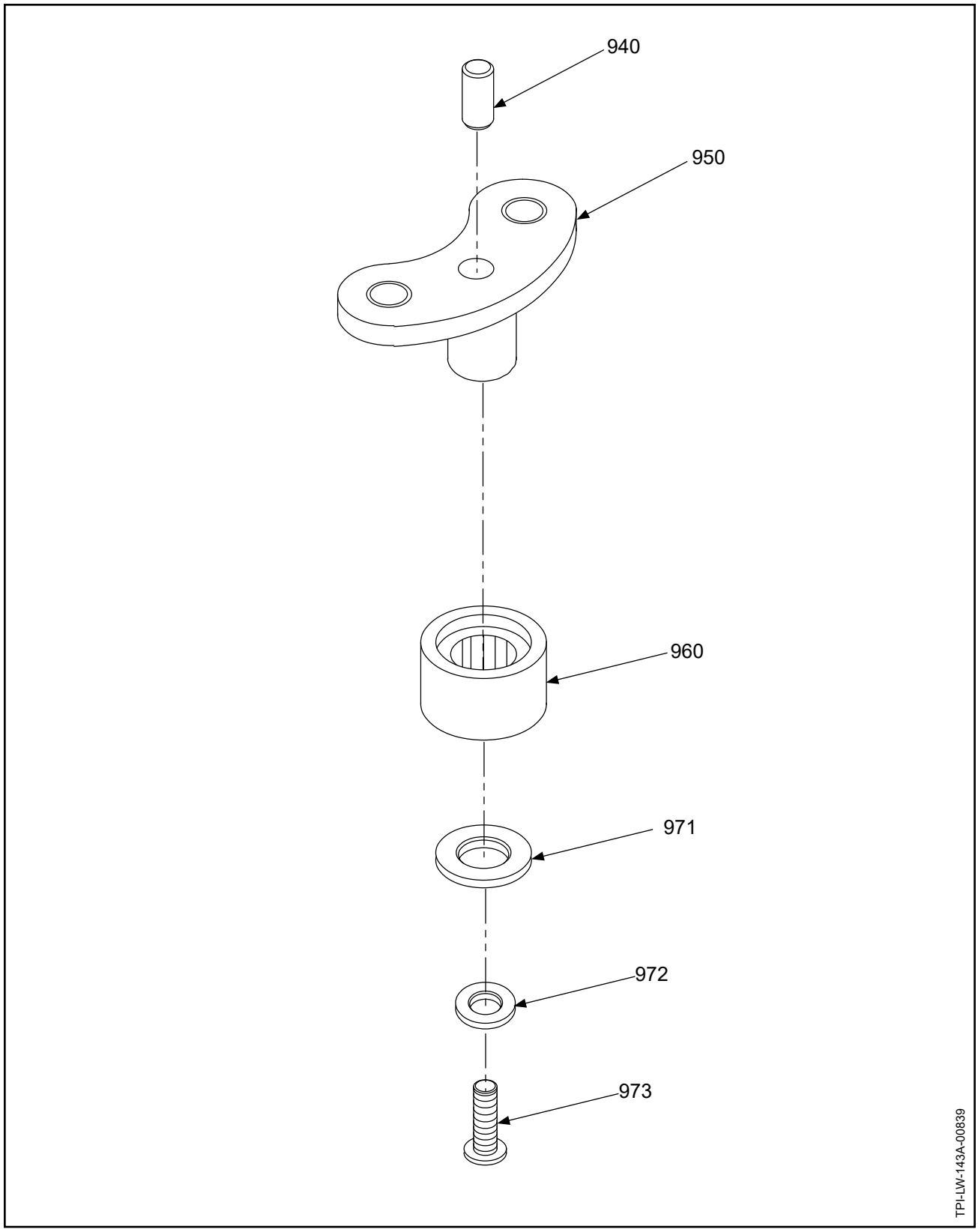
108046: Hub Assembly
Figure 10A-10

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-10		**108046: HUB ASSEMBLY PARTS**				
-445	108046	PCP: HUB ASSEMBLY, HC-E4(N,P,W)-3KTVY		1		PCP
446	103419	• PLATE, HUB MOUNTING		4		
1150	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
450	107930	• PCP:HUB UNIT, HC-E4(N,P,W)-3KTV(Y)		1		PCP
470	B-5952	• • HUB BUSHING, ROD		1		
480	C-3317-135-2	• • O-RING (CYLINDER-SIDE BUSHING OD)		1	Y	
490	A-6153-162	• • RING, RETAINING, EXTERNAL, SPIRAL (CYLINDER-SIDE)		1	Y	
500	B-6108	• • HUB BUSHING, ROD		1		
510	C-3317-026-2	• • O-RING (ENGINE-SIDE BUSHING OD)		1	Y	
520	A-6153-137	• • RING, RETAINING, EXTERNAL, SPIRAL (ENGINE-SIDE)		1	Y	
530	A-2249	• • HUB BUSHING, GUIDE		1	Y	
-540	B-6142	• • INSERT, 1/4-28, CRES, COILED		8	Y	
780	B-454	• • SPRING RETAINER, BETA		4		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

108046: Hub Assembly



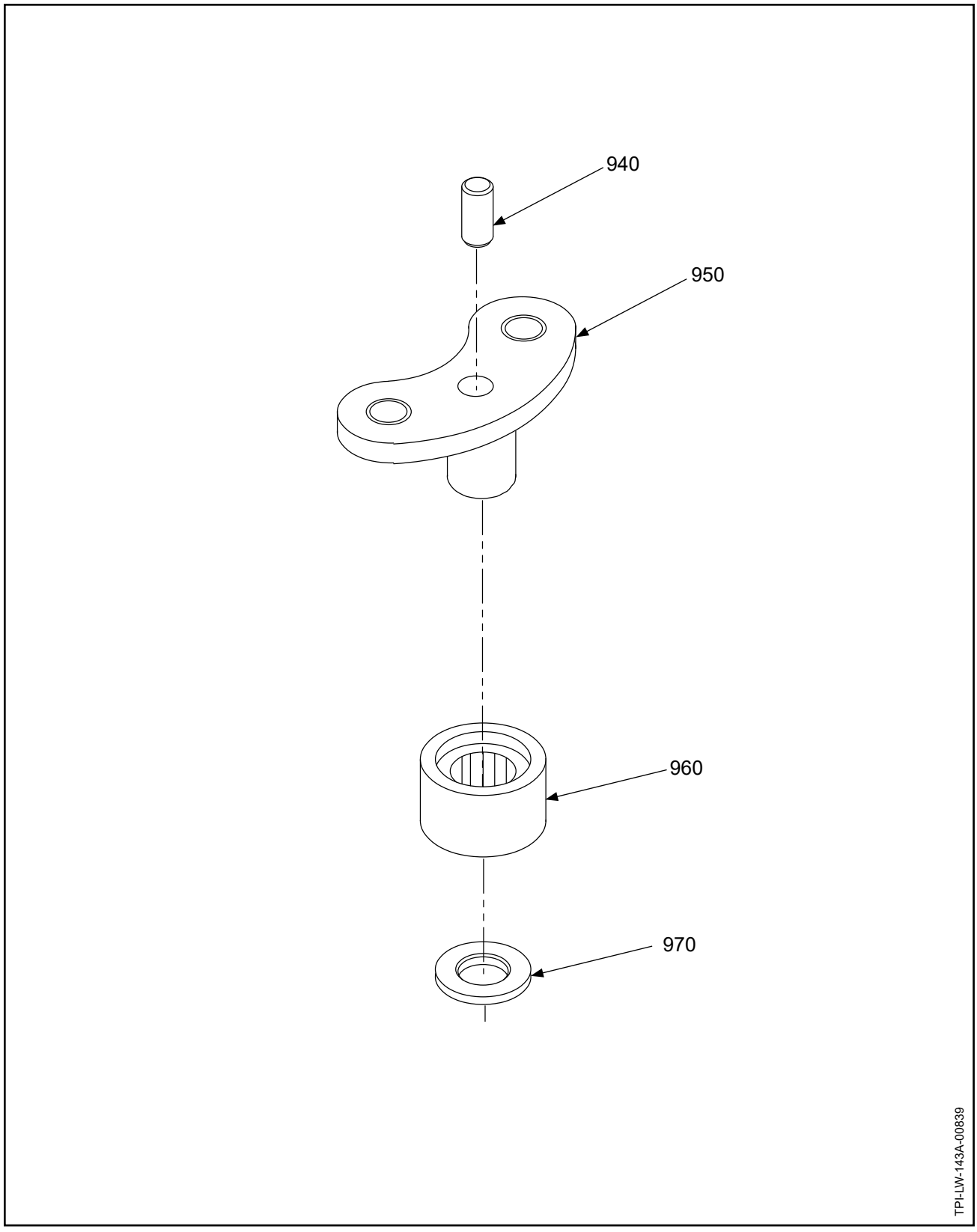
B-464-( ): Pitch Change Knob Bracket Unit
Figure 10A-11

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-11		**B-464-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	B-464-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
-930A	100028-( )	BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 REPLACED BY ITEM 930B (REFER TO "100028-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTSLIST)		4		
-930B	108303-( )	BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 930 AND 930A, POST HC-SB-61-389 (REFER TO "108303-( ): PITCH CHANGE KNOB BRACKET UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
940	B-6260	• • DOWEL PIN, 3/8 INCH		1		
950	B-465-( )	• • BRACKET, KNOB, PITCH CHANGE, REPLACED BY ITEM 950B USE WITH ITEM 970		1		
950A	B-465-( )A	• • BRACKET, KNOB, PITCH CHANGE (MODIFIED) REPLACED BY ITEM 950B USE WITH ITEMS 971, 972, AND 973 POST HC-SB-61-346	A	1		
950B	108302-( )	• • BRACKET, KNOB, PITCH CHANGE REPLACES ITEM 950 AND 950A, POST HC-SB-61-389, R1		1		
960	B-6545	• • CAM FOLLOWER		1	Y	
-970	B-475	• • WASHER, RETAINING, KNOB UNIT USE WITH ITEM 950		1	Y	
971	103395	• • KNOB UNIT RETAINING WASHER USE WITH ITEMS 950A, 972, AND 973 POST HC-SB-61-346		1		
972	B-3860-10L	• • WASHER, DIMPLED, 100° CRES USE WITH ITEMS 950A, 971, AND 973 POST HC-SB-61-346		1	Y	
973	B-3867-272	• • SCREW, 10-32 100°, HEAD, CRES USE WITH ITEMS 950A, 971, AND 972 POST HC-SB-61-346		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	A-465-( )A IS A MODIFICATION OF THE A-465-( ). REFER TO THE CHECK CHAPTER AND THE REPAIR CHAPTER IN THIS MANUAL.		

- ITEM NOT ILLUSTRATED

B-464-( ): Pitch Change Knob Bracket Unit



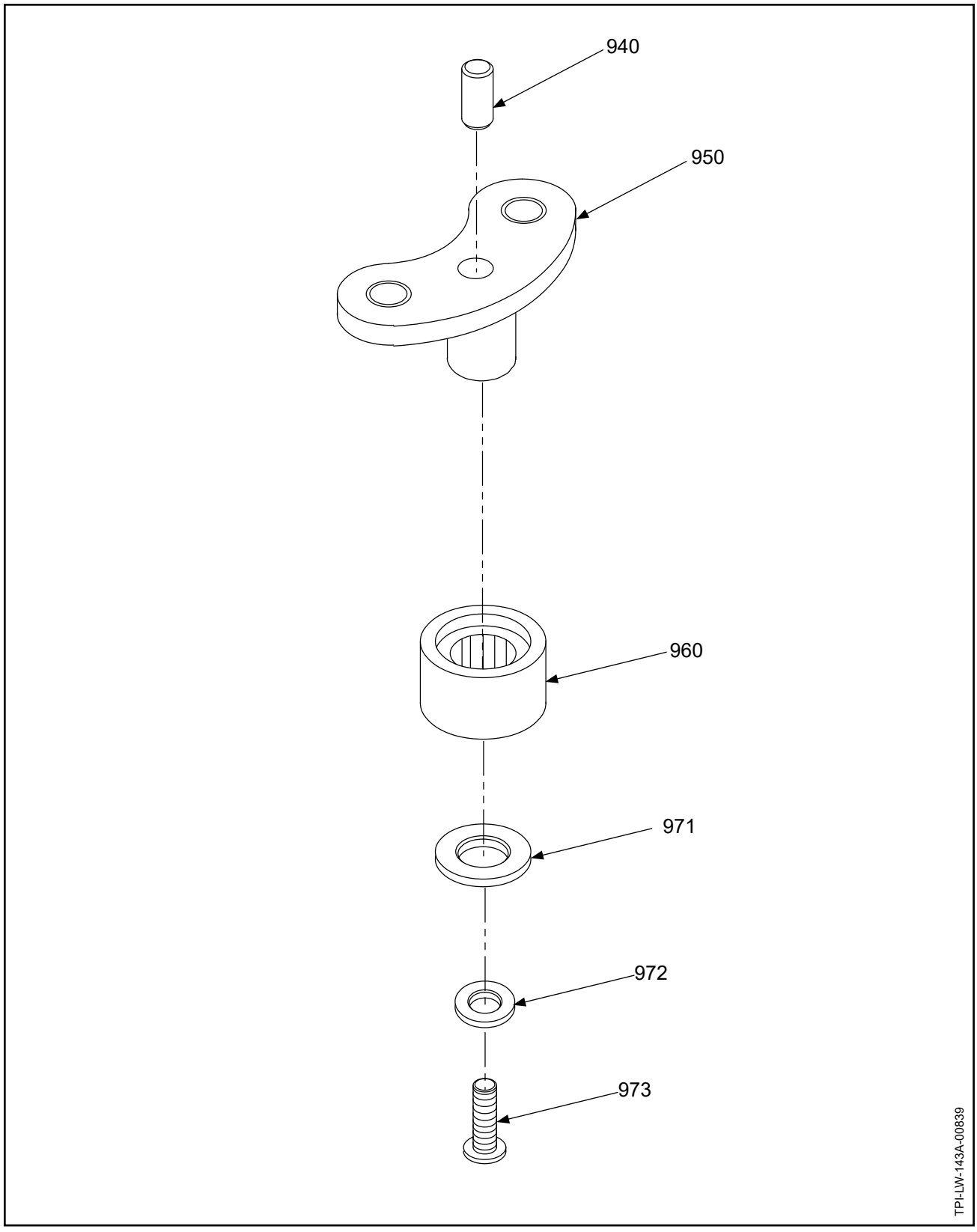
B-6257-( ): Pitch Change Knob Bracket
Figure 10A-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-12		**B-6257-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	B-6257-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
-930A	100032-( )	BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 930, POST HC-SB-61-346 (REFER TO “100032-( ): PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTSLIST)		4		
940	B-6260	• DOWEL PIN, 3/8 INCH		1		
950	C-6253-( )	• BRACKET, KNOB, PITCH CHANGE	A	1		
950A	100031-( )	• BRACKET, KNOB, PITCH CHANGE ALTERNATE FOR ITEM 950, POST HC-SB-61-346		1		
960	B-6545	• CAM FOLLOWER		1	Y	
970	B-475	• WASHER, RETAINING, KNOB UNIT		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	THE C-6253-( ) MAY BE MODIFIED TO THE C-6253-( )A. REFER TO THE CHECK CHAPTER AND THE REPAIR CHAPTER IN THIS MANUAL.		

- ITEM NOT ILLUSTRATED

B-6257-( ): Pitch Change Knob Bracket Unit



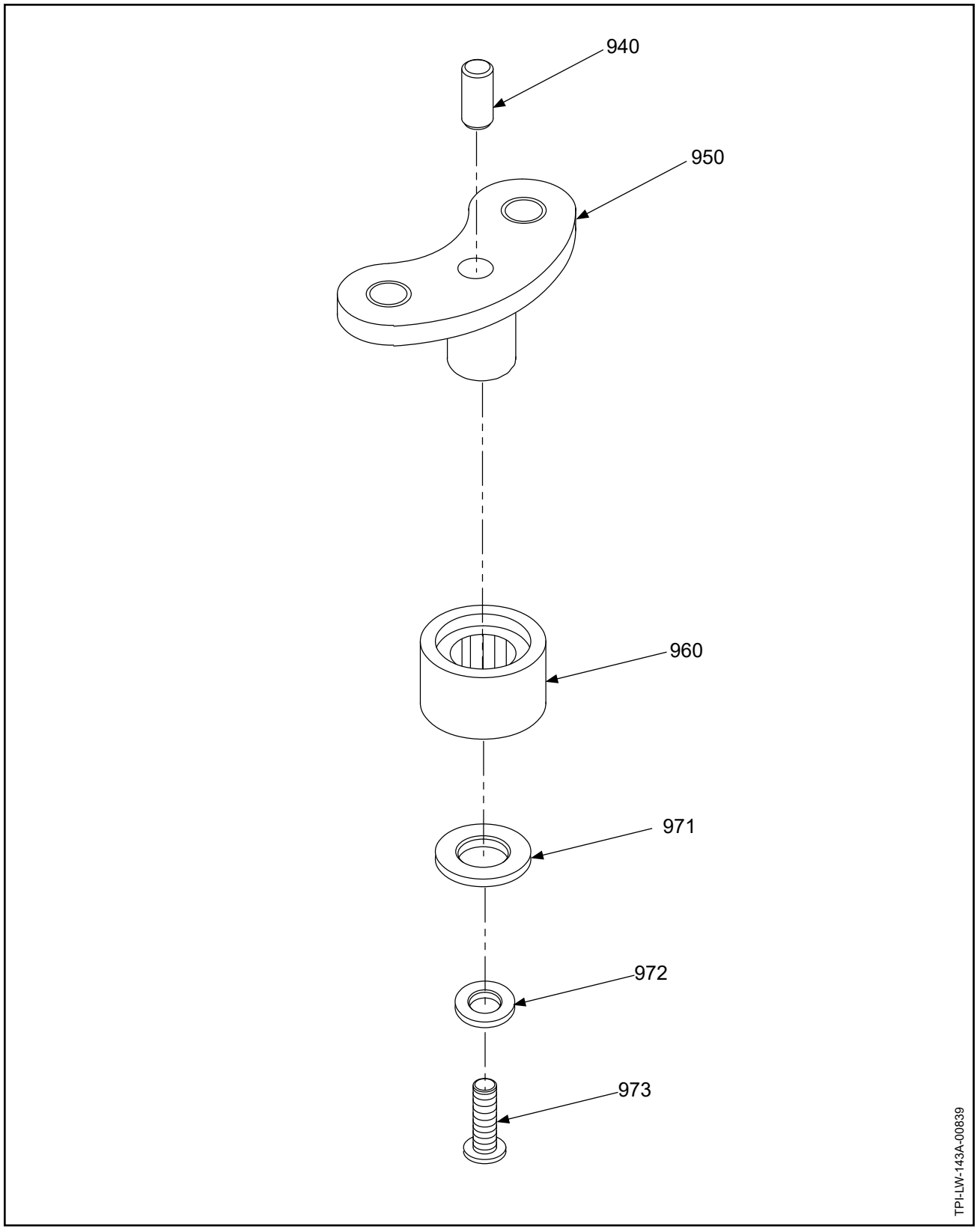
100028-( ): Pitch Change Knob Bracket Unit
Figure 10A-13

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-13		**100028-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	100028-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
940	B-6260	• DOWEL PIN, 3/8 INCH		1		
950	100027-( )	• BRACKET, KNOB, PITCH CHANGE, REPLACED BY ITEM 950A POST HC-SB-61-389, R1		1		
950A	108302-( )	• BRACKET, KNOB, PITCH CHANGE, REPLACES ITEM 950 POST HC-SB-61-389, R1		1		
960	B-6545	• CAM FOLLOWER		1	Y	
971	103395	• WASHER, RETAINING, KNOB UNIT		1		
972	B-3860-10L	• WASHER, DIMPLED, 100° CRES		1	Y	
973	B-3867-272	• SCREW, 10-32 100°, HEAD, CRES		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

100028-( ): Pitch Change Knob Bracket Unit



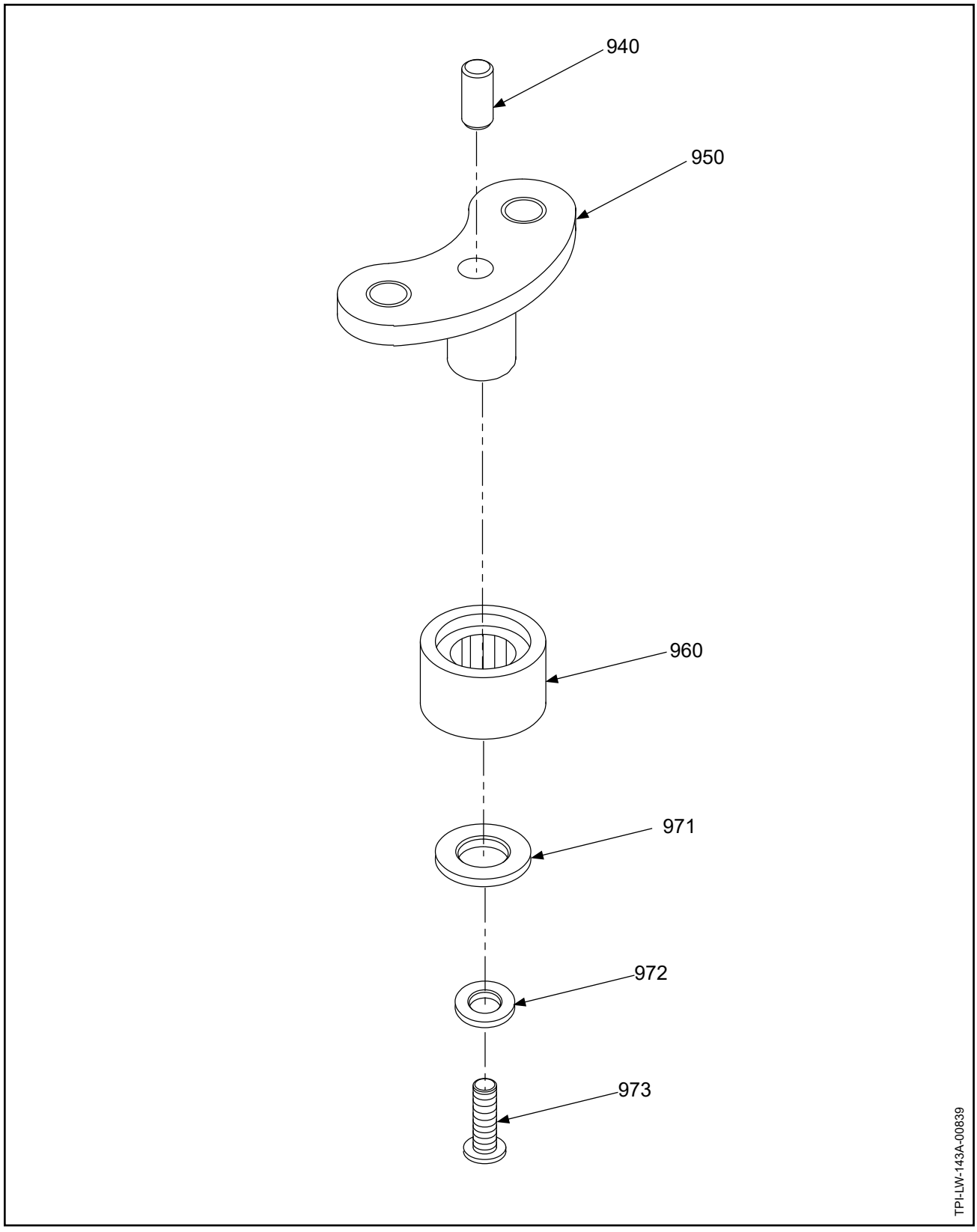
100032-( ): Pitch Change Knob Bracket Unit
Figure 10A-14

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-14		**100032-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	100032-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
940	B-6260	• DOWEL PIN, 3/8 INCH		1		
950	100031-( )	• BRACKET, KNOB, PITCH CHANGE		1		
960	B-6545	• CAM FOLLOWER		1	Y	
971	103395	• WASHER, RETAINING, KNOB UNIT		1		
972	B-3860-10L	• WASHER, DIMPLED, 100° CRES		1	Y	
973	B-3867-272	• SCREW, 10-32 100°, HEAD, CRES		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

100032-( ): Pitch Change Knob Bracket Unit



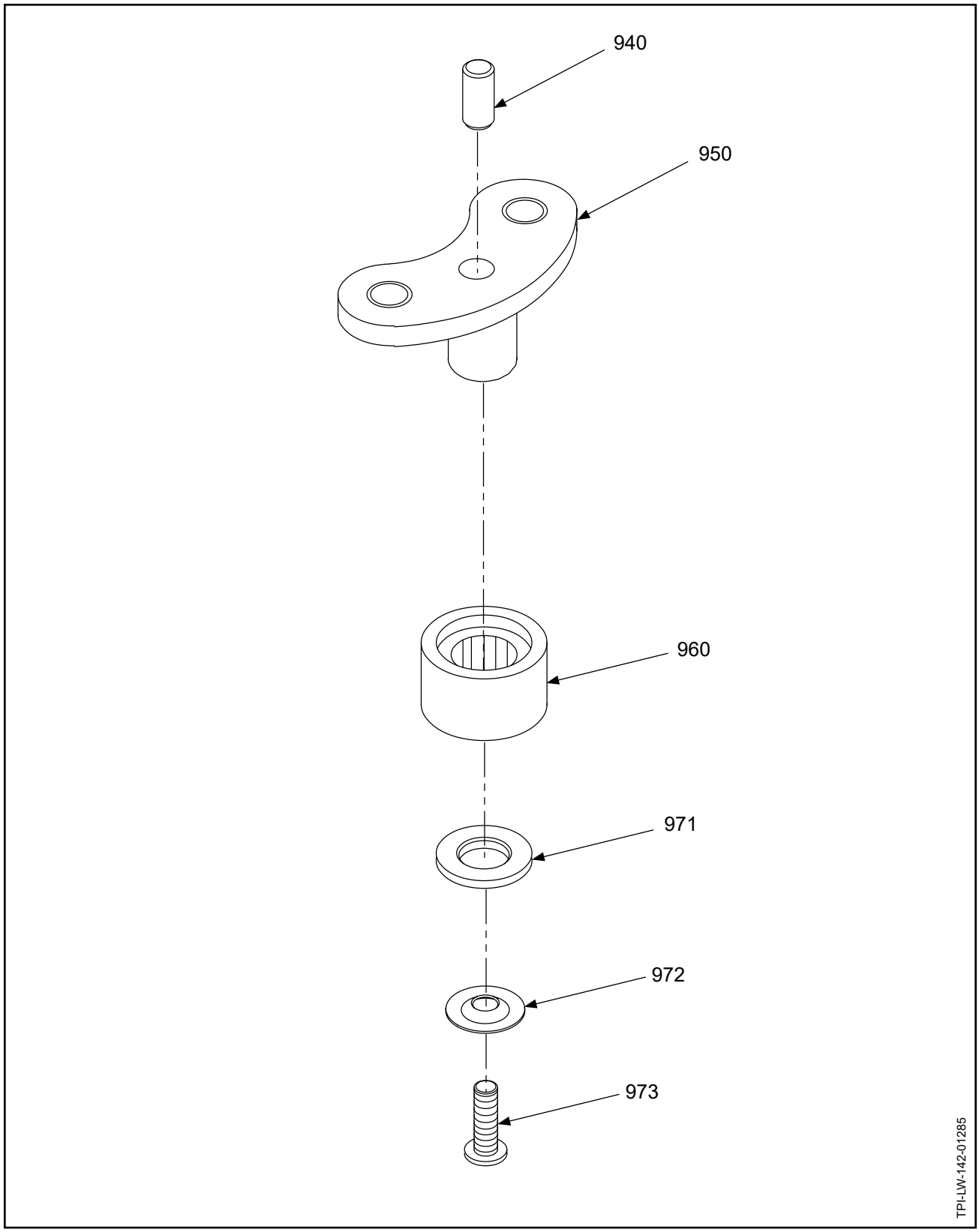
103545-( ): Pitch Change Knob Bracket Unit
Figure 10A-15

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-15		**103545-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	103545-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
940	B-6260	• DOWEL PIN, 3/8 INCH		1		
950	103393-( )	• BRACKET, KNOB, PITCH CHANGE		1		
960	B-6545	• CAM FOLLOWER		1	Y	
971	103395	• WASHER, RETAINING, KNOB UNIT		1		
972	B-3860-10L	• WASHER, DIMPLED, 100° CRES		1	Y	
973	B-3867-272	• SCREW, 10-32 100°, HEAD, CRES		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

103545-( ): Pitch Change Knob Bracket Unit



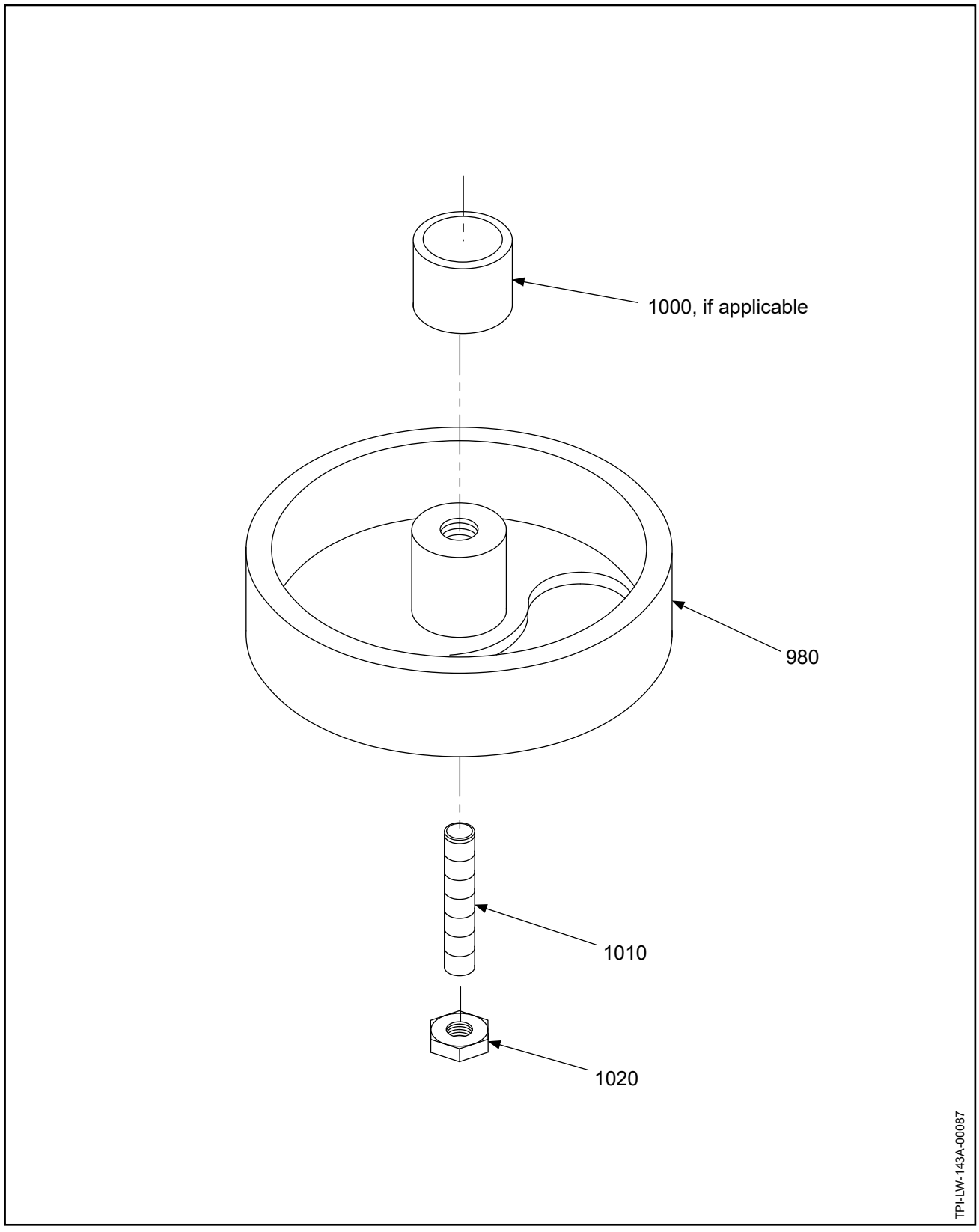
108303-( ): Pitch Change Knob Bracket Unit
Figure 10A-16

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-16		**108303-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-930	108303-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		4		
940	B-6260	• DOWEL PIN, 3/8 INCH		1		
950	108302-( )	• BRACKET, KNOB, PITCH CHANGE		1		
960	B-6545	• CAM FOLLOWER		1	Y	
971	103395	• WASHER, RETAINING, KNOB UNIT		1		
972	B-3860-10L	• WASHER, DIMPLED, 100° CRES		1	Y	
973	B-3867-272	• SCREW, 10-32 100°, HEAD, CRES		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

108303-( ): Pitch Change Knob Bracket Unit



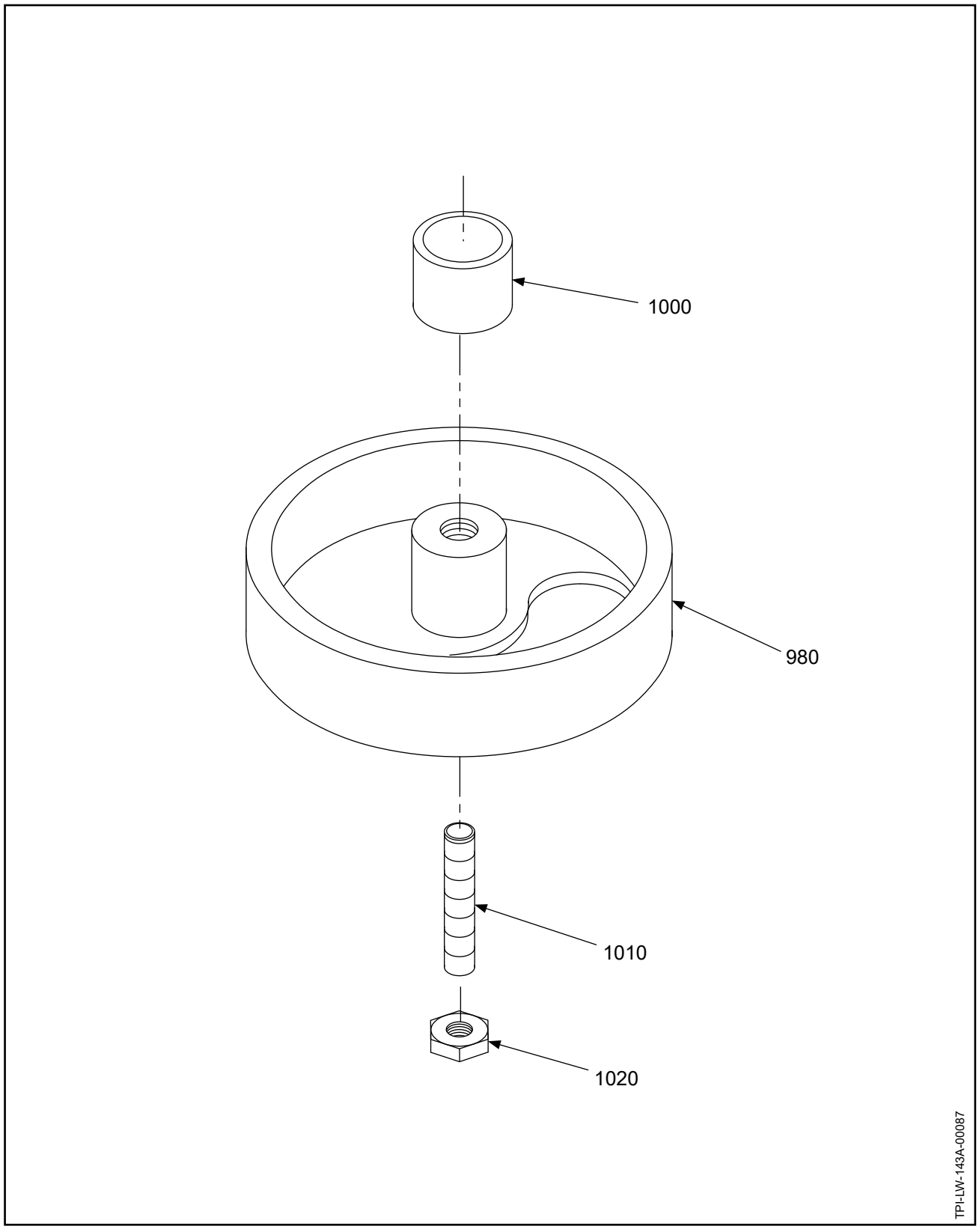
100641-( ): Preload Plate Assembly
Figure 10A-17

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-17		**100641-( ): PRELOAD PLATE ASSEMBLY**				
		100641 PRELOAD PLATE ASSEMBLY				
980	100641	PRELOAD PLATE ASSEMBLY		4		
1000	A-1272	• RACE, INNER BEARING		1		
1010	A-3204-2	• SCREW, SET, 5/16-24, REPLACED BY ITEM 1010A		1	Y	
1010A	B-7019-2	• SCREW, SET, 5/16-24, REPLACES ITEM 1010,		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
		100641-1 PRELOAD PLATE ASSEMBLY				
980	100641-1	PRELOAD PLATE ASSEMBLY		4		
1010	B-7019-2	• SCREW, SET, 5/16-24, POST HC-SL-61-195		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

100641-( ): Preload Plate Assembly



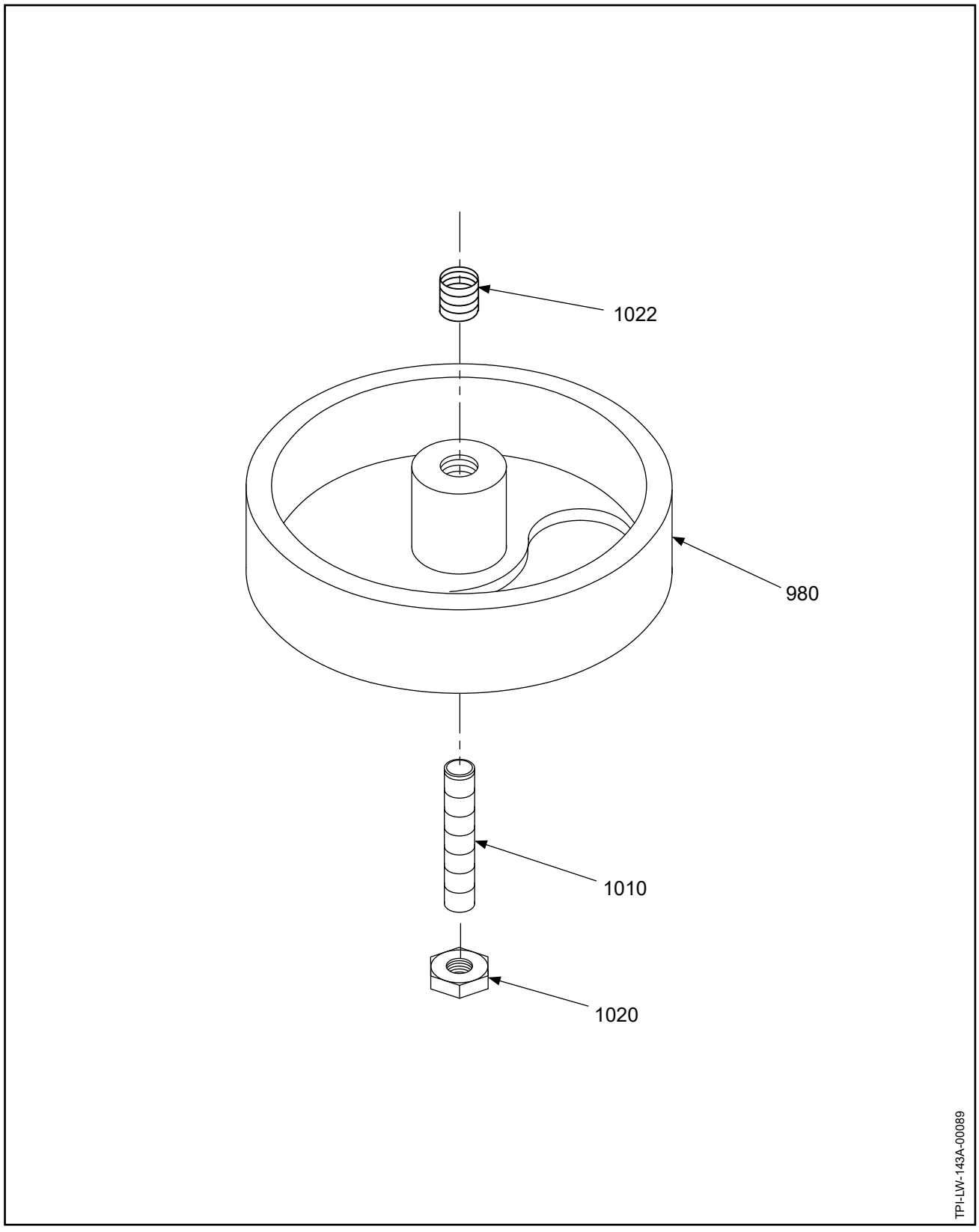
101004: Preload Plate Assembly
Figure 10A-18

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-18		**101004: PRELOAD PLATE ASSEMBLY**				
980	101004	PRELOAD PLATE ASSEMBLY		4		
1000	B-6679	• RACE, INNER, BEARING		1		
1010	A-3204-2	• SCREW, SET, 5/16-24		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

101004: Preload Plate Assembly



103525: Preload Plate Assembly
Figure 10A-19

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-19		**103525: PRELOAD PLATE ASSEMBLY**				
980	103525	PRELOAD PLATE ASSEMBLY		4		
1010	101667	• SCREW, SET, 5/16-24		1	Y	
1020	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
1022	B-6986-314M	• INSERT, THREADED, THIN WALL		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

103525: Preload Plate Assembly

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